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Document Number

LOC-GDE-HSEQ-007




Document Title

Water Management Plan

Document Owner Kirsty MacIntyre

Document Approver Morgan McConnell

Revision History					
Rev	Doc Status	Revision Comments	Created by	Approved by	Issue Date
2.3	Draft	Revision History Table added			22/03/2024
2.4	Issued	Section 4.4 updated to include "High Risk" mitigation measures. Sent through approval System	Kirsty MacIntyre	Morgan McConnell	07/05/2024

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1 Introduction

The GFG Lochaber procedure LOC-PRO-HSEQ-010 Water Use and Quality Control, states:

'Develop and implement a water management plan that describes the operational aspects for water management to comply with the intent of this standard and with regulations and requirements of the pertinent authorities.'

The intent of this standard is to ensure efficient, safe, and sustainable management and protection of water resources and ecosystems in and around Lochaber and Kinlochleven operations. This requires an understanding of the water resources, their spatial and temporal interrelationships, their ownership in the region and the needs of catchment stakeholders. This provides the basis for the development of an integrated and strategic approach to water management including social, environmental, operational, and economic aspects.

2 Description of Unit Property

With landholdings of approximately 45,750 hectares, GFG Lochaber is one of the most significant private landholders in Scotland. The area associated with the aluminium and power production makes up only 17 ha of relatively flat land which is a very small proportion of the total. The remainder is made up predominantly of three GFG estates which include mainly forestry, agricultural land and water catchment area for the hydro-scheme. As well a few natural and cultural heritage sites which are visited by thousands of tourists every year due to the growing tourist industry within the area.

2.1 Location of the Business Unit

Fort William is situated on the west coast of Scotland, approximately 100 miles north of Glasgow, on the shores of Loch Linnhe, as shown in Appendix A. The GFG Lochaber business unit is located a further 2 km to the Northeast of Fort William, at an elevation of 16m above ordnance datum (AOD). The nearest residential premises to the business unit are 390 metres to the north of the smelter. The entrance to the smelter is located at the National Grid Reference NN 1245 7501.

2.2 Geology and Physiography

The business unit lies within the Grampian Highlands. The rock types shall be discussed with reference to 3 specific areas.

- The Ben Nevis Group (BGS Sheet 53)
- The Glen Roy Group (BGS Sheet 63W)
- The Blackwater Group (BGS Sheet 54W)




These maps also detail the minor faults and slips in the area. There are no minor faults or slips associated with the smelter to act as pollution pathways.

The 3 Groupings can be split into distinct areas incorporating the following geological groupings.

- Moine Supergroup
- Devonian Supergroup, and
- Caledonian intrusions

Typical rock types found within these groupings on the land holding are as follows.

- Dolemite
- Gneiss
- Granite
- Granodiorite
- Limestone
- Quartzite, and
- Schist

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With drift incorporating peat and glaciofluvial deposits

2.3 Hydrography

The majority of the GFG Lochaber catchment lies within the Argyll and Lochaber Water Basin. There is also part of the catchment which falls into the Northeast draft management plan.

The BGS map detailing the hydrogeology of Scotland shows the smelter to be situated in an area underlain with impermeable rocks from the Precambrian era, generally without groundwater except at shallow depth. The rock is a crystalline basement rock, and as such does not possess any primary porosity. Any water storage is generally attributable to secondary porosity resulting from fracturing or weathering. The superficial deposits are not given a hydrogeological classification.

All surface water from the smelter area ultimately discharges to the East Burn or the Tailrace before entering the River Lochy. The East Burn collects to the North East of the smelter and follows the Northern boundary of the site, before discharging to the Tailrace approximately 500m to the North West, at grid reference NN 119 753. The Tailrace begins to the East of the Powerhouse, is channelled underground before reappearing at grid reference NN 124 752. The Tailrace discharges to the River Lochy at grid reference NN 1245 7501. The smelter Tailrace discharges to a tidal zone of the River Lochy, before ultimately discharging to Loch Linnhe. Although not being designated as bathing waters, Loch Linnhe is recognised as being used for recreational purposes. Typical activities include fishing, sailing and pleasure cruising.

The groundwater vulnerability for the area can be weakly to moderately permeable with an estimated infiltration rate for the area is less than 100 mm per year. Intrusive investigations have identified groundwater within superficial deposits and in bedrock at a few locations around the smelter site. Typically, the water table was found in discontinuous deposits of sand and gravel overlying bedrock, at depths of 1.0m to 3.0m below ground level. Appendix B illustrates pathways and receptors of pollution and groundwater movement beneath the smelter site.

Groundwater is regularly monitored at the site, with reference to the conditions applying to the Waste Management License for the landfill site to the North of the smelter boundary. Groundwater flow in this area has been indicated to flow towards the East Burn, Tailrace, and the River Lochy.

2.4 Climate




Lochaber is situated in the Highlands of Scotland. On the edge of the landmass of Europe, the Highlands lie between the stable air of the Continent and the Atlantic weather-fronts to the west. It is the meeting of these two weather systems - high pressure and low pressure, continental and maritime that makes the weather so changeable. The Lochaber region is one of the wettest areas in Scotland with an average rainfall of approximately 1700mm at the smelter, increasing to approximately 4000mm on the summit of Ben Nevis. Snowfall in the region is highly variable and changes from one year to the next.

The nearest Meteorological Office monitoring station is situated at Tulloch Bridge, Fersit (approximately 15 miles North East of Fort William). Tulloch Bridge is located approximately 1km north of Treig Dam, GFG Lochaber's principal reservoir. An additional automatic weather station, operated by GFG personnel, was installed at the Lochaber Smelter in October 2006. Extensive records of daily rainfall figures have also been recorded manually and continue to be recorded at the Smelter Hydro Depot supplementary to the automatic weather station.

Typically, there are approximately 275 days of rainfall annually at the Lochaber Smelter. The average temperature on-site for 2008 was 9.4°C, with a minimum of minus 8.9°C and maximum 29.3°C. The average wind speed was 12.2 km/hr of dominant direction WSW, with a high of 122.3 km/hr.

2.5 Administrative Framework and Tenure

The land occupied by the GFG Highland Estates comes under two different regional Councils, Highland and Moray Council and these cover all general and planning issues. The Health and Safety Executive, Scottish Environmental Protection Agency (SEPA) and the Scottish Natural Heritage (SNH) cover any regulatory framework.

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2.5.1 Environmental Permits, Legislation and Agreements

Current permits issued by SEPA that have a direct association with impoundments, abstractions or discharges to the water environment are listed in table 1 below. Table 2 illustrates other legislation specifically related to the management of the water environment within the GFG land holdings or water catchment. Additional agreements associated with the management of the water environment are listed in table 3.

Table 1 Environmental Permits Related to the Water Environment

Permit Reference	Issue Date	Description
CAR/L/1025365	24 April 2009	Loch Eilde Mor hydro scheme
CAR/L/1002904	09 May 2007	Lochaber landfill leachate discharge
CAR/L/1012344	12 December 2006	Lochaber hydro scheme
CAR/L/1170801	February 2019	Allt Coire An Eoin Limited
CAR/L/1173902	February 2019	Allt Daim Limited
CAR/L/1173904	February 2019	Allt Leachdach Limited
CAR/L/1012393	12 December 2006	Kinlochleven hydro scheme
PPC/N/50007	31 August 2004	SIMEC operational permit
PPC/N/1157314	23 June 2017	Liberty Aluminium operational permit

2.5.2 Table 2 GFG Specific Legislation

Loch Leven and Lochaber Water Power Order Confirmation Act 1995

Lochaber Water Power Order Confirmation Act 1984

Lochaber Water Power Order Confirmation Act 1940

Lochaber Water Power Order Confirmation Act 1938

Lochaber Water Power Act 1930

Lochaber Water Power Act 1921

Loch Leven Water Power (transfer) Order 1910

Loch Leven Water Power Order 1908

Loch Leven Water Power (amendment) Act 1904

Loch Leven Water Power Act 1901

2.5.3 Agreements

1977 Lochy Agreement. Proprietors of the River Lochy Fishing.
Fishing rights for salmonids on the river Spean, Cour and Allt Leachdach.

1963 Spey Agreement. Spey Fisheries Board.
Update to '54 agreement

1954 Spey Agreement. Spey Fisheries Board.

An agreement made in relation to the water management i.e. impoundment, abstraction and compensation flows from the Spey reservoir and with particular reference to the management of fisheries including number and timing of freshets to be given each year.

2.6 Protected Areas

The following table details the SAC's and SSSI's located in such a way that operations have a direct impact on the water environment within the designated area or the designated area forms part of the immediate water catchment area.




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Table 2 Sensitive Natural Receptors Local to the Lochaber Smelter:

Site	Designation	Distance from Smelter (km)	Grid reference (centre)	Area (ha)
Ben Nevis	SAC	0.5	NN 198 705	9317.18
Ben Nevis	SSSI	0.5	NN 205 720	9617.00
Creag Meagaidh	SAC	35.4	NN 452 886	6144.58
Leven Valley	SSSI	16.8	NN 210 606	580.30
Monadliath	SAC	56.6	NH 623 017	10671.11
Parallel Roads Lochaber	SSSI	20.2	NN 300 850 & NN 200 810	14650
River Spey	SAC	112.5	NJ 095 319	5729.48

Full details appertaining to the above protected areas are contained in Land Use Management Plans. Only the River Spey SAC will be detailed further in this management plan, further details of which can be found in Appendix C.

3 Lochaber Water Catchment Area

3.1 Upstream

3.1.1 Surface Waters

There are no upstream discharges or abstractions from the owned catchment. For the un-owned catchment area the other users are primarily, Ardverikie Estate and Corrour Estate for Lochaber, both of whom utilise the surface waters for drinking supplies, small scale hydro operations and trout fishing, none of which impacts on the availability of water in the catchment for GFG Alliance operations. In addition, Inverloch Castle Hotel and the Ben Nevis Distillery abstract water from GFG's Hydro Scheme as part of a historic agreement.

3.1.2 Groundwater

No known groundwater abstractions.

3.2 Downstream

3.2.1 Surface Waters

Downstream surface waters are primarily utilised for recreational purposes, i.e., fishing, kayaking, etc. This is accurate for all parts of the operation including the main Waterbodies and the mouth of the tailrace.

3.2.2 Groundwater




The only known utilisation for groundwater in the downstream catchment is by Scottish Water, who abstract from ground waters associated with the River Lochy gravels at Camisky, approximately 6 miles north of the smelter.

4 Description of Water Infrastructures and Water Balance

4.1 Lochaber Hydro Scheme

4.1.1 General Description

The hydro scheme as it is today essentially constructed in three stages (between 1927 and 1943:

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- Stage 1 saw the construction of a 4.50m diameter pressure tunnel a distance of 15 miles (24 km) from Loch Treig to Fort William, allowing aluminium production to commence in 1929. The tunnel terminates in a Surge Shaft which is 9.14 metres in diameter and 72.5 metres deep. From the bottom of the Surge Shaft, two branch tunnels connect inlets of the five mild steel, all welded pipelines which supply the distribution pipes to the power station.
- In 1931 the second stage of the scheme pushed ahead with the construction of the Laggan Dam across the River Spean, raising the level of Loch Laggan and providing a reservoir of 40 million cubic metres capacity.
- A third stage, the diverting of the flood waters of the river Spey via a tunnel to Loch Laggan, was completed with the help of Canadian troops in 1943.

As the hydro scheme is approaching nearly 100 years old it is already highly optimised with regards to water efficiency and minimisation of loss. That being said, we are continuously looking for modern technological innovations to improve and enhance our monitoring techniques. We have long term goals to have full remote water level monitoring at all of our dams by 2025 and full video surveillance to manage changing conditions by 2030. If emerging techniques can be used to improve our sites we will not be bound by the aforementioned targets but also look to undertake all improvements where possible.




The site already has reduced water abstraction levels, withdrawing less than 44% of its total water abstraction allowance set by SEPA between 2018-2022. As well as this, a 24hr compensation flow is released to ensure the rivers always maintain a certain flow rate. Plans to further reduce water abstraction may be implemented in the future where possible.

4.1.2 Summary of Controlled Activities

The following tables summarise the key information relating to each of the controlled activities as contained in the authorisation CAR/L/1012344.

Table 3 Lochaber Abstraction Points.

Description	Location	Associated Waters	Abstraction Method
Crunachdan intake	NN 5436 9243	River Spey	Free flow
Mashie Dam	NN 5872 9096	River Mashie	Free flow
Mashie aqueduct intake	NN 5835 9088	None	Free flow
Laggan tunnel intake	NN 3724 8062	River Spean/ Loch Laggan	Free flow
Intake A	NN 3709 8023		Free flow
Intake B	NN 3619 7855	Allt Chaorach Mor	Free flow
Intake C	NN 3575 7806	Allt Chaorach Beag	Free flow
Allt Coire an Bhinnean	NN 2377 6911	Allt Coire an Bhinnean	Free flow
Treig Tunnel intake	NN 3425 7590	Loch Treig	Free flow
Intake 1	NN 3285 7776	Allt Laire	Free flow
Intake 2	NN 3166 7922	Allt nam Bruach	Free flow
Intake 3	NN 2934 7990	Allt Coire na Criche	Free flow
Intake 4	NN 2761 7957	Allt Beinn Chlianaig	Free flow
Intake 5	NN 2602 7831	Allt Leachdach	Free flow
Intake 6	NN 2398 7649	Allt Choimhlidh	Free flow
Intake 7	NN 2260 7582	Allt Coire an Eoin	Free flow

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Description	Location	Associated Waters	Abstraction Method
Intake 8	NN 2049 7667	Allt Choille Rais	Free flow
Intake 9 East	NN 1785 7652	Allt an Sneachda	Free flow
Intake 9 West	NN 1779 7644	Allt an Sneachda	Free flow
Intake 9 far West	NN 1780 7641	Allt an Sneachda	Free flow
Intake 10	NN 1621 7590	Allt Daim	Free flow
Intake 10 Diversion	NN 1669 7580	Allt Daim	Free flow
Intake 11	NN 1413 7571	Allt a Mullinn	Free flow
Allt Coire an Lochaine	NN 1456 7466	Allt Coire an Lochaine	Free flow

Table 4 Lochaber Abstraction Return Points

Name/Reference	NGR	Associated Waters	Discharge Measurement Method
Spey tunnel outfall	NN 5378 8962	Loch Laggan	Level gauge at Crunachdan intake
Mashie aqueduct outfall	NN 5665 9025	River Pattack	Level gauge in aqueduct
Laggan to Treig outfall tunnel	NN 3475 7700	Loch Treig	Calculated on level differential between Lochs Laggan and Treig
Flow into Abhainn Rath	NN 2425 6930	Abhainn Rath	Not measured
Tailrace outfall	NN 1185 7539	River Lochy	Pipeline flow gauges

4.2 Kinlochleven Hydro Scheme

4.2.1 General Description


The Kinlochleven Hydro Electric Scheme uses water impounded by Blackwater Dam for the generation of 20 MW of power in the Kinlochleven Power House. The main catchment comprises of; Blackwater Dam, a closed conduit channel 5 km long and a 6-line pipe track 2 km long. There is also the Loch Eilde Mor sub-catchment which comprises of Loch Eilde Mor Dam and currently a diversion pipeline leading to Blackwater Reservoir. It is planned that this pipeline be decommissioned and the water from the Loch Eilde Mor catchment be used to supply a new dedicated powerhouse.

4.2.2 Summary of Controlled Activities

The following tables summarise the key information relating to each of the controlled activities as contained in the authorisation CAR/L/1012393.

Table 5 Kinlochleven Abstraction Points

Description	Location	Associated Waters	Abstraction Method
LEM Dam	NN 2176 6318	Loch Eilde Mor	Free flow
Intake 1	NN 2126 6108	Un-named tributary of the River Leven	Free flow
Intake 2	NN 2356 6186	Allt Coire na Duibhe	Free flow
Intake 3	NN 2440 6097	Allt an Lochain Dhuibh	Free flow

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Description	Location	Associated Waters	Abstraction Method
Blackwater Dam	NN 2473 6024	Blackwater Reservoir	Free flow
Intake 1 – KA-06	NN 2427 6002	Allt an Eoin Bhinn	Free flow
Intake 2 – KA-07	NN 2226 5967	Allt Choire Odhair- bhig	Free flow
Intake 3 – KA-08	NN 2168 6007	Allt Choire Odhair- mhoir	Free flow

Table 6 Kinlochleven Impoundments

Name/Reference	NGR	Associated Waters	Compensation Measurement Method
LEM Dam	NN 2176 6318	Loch Eilde Mor	Required to be installed
Intake 1	NN 2126 6108	Un-named tributary of the River Leven	N/A
Intake 2	NN 2356 6186	Allt Coire na Duibhe	N/A
Intake 3	NN 2440 6097	Allt an Lochain Dhuibh	N/A
Blackwater Dam	NN 2473 6024	Blackwater Reservoir	N/A
Intake 1 – KA-06	NN 2427 6002	Allt an Eoin Bhinn	N/A
Intake 2 – KA-07	NN 2226 5967	Allt Choire Odhair- bhig	N/A
Intake 3 – KA-08	NN 2168 6007	Allt Choire Odhair- mhoir	N/A

Table 7 Kinlochleven Abstraction Return Points

Name/Reference	NGR	Associated Waters	Discharge Measurement Method
Pipeline outfall to Blackwater	NN 2495 6080	Blackwater Reservoir	Not measured
Tailrace outfall	NN 1883 6201	River Leven	Flow measurement gauge at top of pipelines.

4.3 Hydro Scheme Design Standards

The hydro scheme is designed and maintained to current regulations and inspections are in line with the Reservoirs Act.


4.4 Lochaber Water Strategy

Details of the water strategy are held by the Power and Hydro Manager and are updated in line with site strategy including pot load and power prices.

The site has carried out extensive risk analysis surrounding various emergency situations related to the hydro scheme and have emergency response plans in place.

As well as this, all material risks from the hydro scheme to the surrounding environment have been identified and are listed alongside mitigation measures within the Water Stewardship Risk Assessment.

This risk assessment identified two hazards with a high residual risk rating. These risks and associated mitigation measures are outlined below:

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4.4.1 Dam Failure

Across the Lochaber Hydro Scheme we have three reservoirs designated as “High Risk” under the Reservoirs (Scotland) Act 2011. This classification is assessed primarily on the impact of an uncontrolled release of water from a dam failure, based on the capacity of the reservoir. Spey Dam, Laggan Dam and Treig Dam fall into this category based on the structures overall size and the capacity of each respective reservoir. To ensure that the overall risk of a dam failure is minimised we have a strict monitoring and maintenance regime in place to mitigate any potential failure mechanisms developing. These include:

- Quarterly inspections by a Civil Engineer
- Bi-annual inspections by an Independent Supervising Engineer. This includes the submission of a report and written statement under Section 50 under the Reservoirs (Scotland) Act 2011, which is reviewed by the regulating body, SEPA.
- Daily inspections by Hydro Scheme Operators
- Daily monitoring of the dam levels, surrounding land and current and incoming weather conditions
- Ongoing monitoring of data
 - Dam foundation leakage
 - Tunnel flow between each reservoir
 - Downstream compensation flow
- Planned maintenance schedules
 - All mechanical equipment including sluice gates, mechanically actuated compensation outflows and valves tested annually.
 - Upstream face of dams checked routinely for build-up of sediment or materials causing additional stress/force
 - Concrete repairs to structures when necessary
 - Routine ROV inspections of underwater areas of the structures

4.4.2 Climate Change

Identified in the Water Stewardship Risk Assessment is the economic risk to the business based on Climate Change and the impact it may have on our Hydro Operations. As above, it is in our operating procedure to monitor the Lochaber Hydro Scheme daily and due to that we can alter our operational capacities to manage potential flooding or drought. For example, we may have a controlled release of water from our reservoirs if we can see that significant overtopping may occur in the near future based on an extremely high period of runoff being forecasted. This would avoid potential flooding. On the contrary, we may be able to release water slowly over a longer period of time to avoid any drought areas downstream of the dam.

To minimise the financial risk to the business we are continually learning more about the potential impacts of Climate Change and specifically monitoring short- and long-term weather patterns for the Lochaber Hydro Scheme area. We have also modernised our Hydro Operations by increasing our Import and Export capacity to the National Grid, which allows us to be more flexible with the amount of water we need to or can use at any given time of the year. This builds in additional resilience to the business for the long term, thus reducing the overall financial risk.

4.5 Lochaber Smelter Water Related Operations


4.5.1 Domestic Water Supply

4.5.1.1 Design Standards

All owners and occupiers of commercial/industrial premises, and anyone who installs or maintains plumbing systems and water fittings, have a legal obligation to ensure that the systems and fittings meet the requirements of the Water Byelaws 2004. In Scotland these regulations are regulated by Scottish Water.

4.5.1.2 Domestic Water Consumption

Water for general use, i.e. drinking, toilets and showers, is sourced from the town supply provided by Scottish Water.

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4.5.1.3 Contingency Planning

Water related emergency plans are held with the others site emergency response plans.

4.5.2 Fire Fighting Water

The site is served by a dedicated fire water ring main. Supply is gravity fed from the hydropower pipelines. Fire hydrants are located strategically throughout the site, see Appendix D.

4.5.3 Process Water

Water used in the casting process is sourced from the hydropower pipelines and can be additionally sourced from the tailrace using electrically driven pumps. In case of interruption to cooling water during casting an emergency supply of water is available from a gravity fed tank located in the casting shop.

4.5.4 Domestic Wastewater

The smelter contains four septic tanks serving the Powerhouse, Workshops, Cell Room and the Main Office and Welfare Block. The Powerhouse Septic Tank discharges to the Tailrace at national grid reference NN 1275 7519, whereas the others discharge to the East Burn at national grid reference NN 1233 7514. Details of the wastewater network are illustrated in drawing 01/9-137 held in the site drawing office. Desludging of the septic tanks is carried out under contract or as required for any additional work by Scottish Water.

4.5.4.1 Contingency Planning

Manholes are inspected and in the event of a failure Scottish Water can be contacted to facilitate the clean-up, removal, and disposal of all waste materials of this type.

4.5.5 Trade Effluent

Trade effluent discharges from the Lochaber Smelter are regulated under the Pollution Prevention and Control (Scotland) Regulations 2000. The site operating permit, ref PPC/N/50007 and PPC/N/1157314 as issued by SEPA with the following conditions relating the water quality;


Table 8 PPC Consent Limits – Water.

Determinant	Lower Tier	Upper Tier
BOD (mg/l)	2.5	7
Suspended Solids (mg/l)	10	25
Fluoride (mg/l)	10	25
pH	6	9
Temperature (OC)		25
Tailrace Flow (m3/s)		45
All Surface Waters Oil or grease		No Visible

In addition to these conditions, additional limits are placed on the discharge of leachate to the site tailrace from the old landfill site, these limits are as follows.

Table 9 CAR Consent Limits – Leachate.

Determinant	Lower Tier	Upper Tier
Ammoniacal Nitrogen (mg/l)	49	90
Cyanide (mg/l)	60	120
Free Cyanide (mg/l)	5	10

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Determinant	Lower Tier	Upper Tier
Fluoride (mg/l)	3250	6500
pH	5	11
Flow (l/s)		9.25

4.5.6 Surface Water Runoff

Most of the site is laid to concrete hard standing. The main exceptions are:

- an area between the workshops and the railway siding in the north of the site which is laid to gravel.
- an area to the north of the welfare block which is laid to grass.
- railway sidings in the north and south laid as ballast.
- transformer compounds in the east of the site laid to gravel.

A network of surface water drains serves the hard standing areas of the smelter site. There are two discharges to the East Burn to the North and North West of the Cast Shop, and one discharge point to the Tailrace. Details of the surface water drainage infrastructure can be seen in Appendix E.

4.5.6.1 Contingency Planning

Eight oil interceptors are currently in use at the site in the vicinity of the fuel storage and delivery facilities, vehicle wash areas and Power Station rectifier area. Locations of interceptors and the areas covered by them are illustrated in Appendix E. Table 14 below provides further information about the interceptors on site.

Table 10 Oil Interceptors

Location	Capacity (litres)	Area covered	Notes
Rail tanker oil discharge	2000	Redundant rail tanker discharge point	Redundant
Steel Yard	2000	Steel yard and fuel oil tank and store	-
Rodding Room	2500	Mechanics shop and Rodding Room yard	-
Power Station rectifiers (x5)	1800	Rectifier yard	-

Oil interceptors are inspected and specialist contractor is used to pump out oil when required.




GFG Lochaber are members of the National Oil Pollution Control Club co-ordinated by Briggs Environmental, and as such have agreements in place

4.6 Water Balance

Details of the water balance table are contained in Appendix F, and are maintained by the HSEQ team and updated annually.

5 Water Management Objectives & Performance Targets

Objectives and targets are managed in line with PPC and CAR licence requirements. Individual objectives are included within the ITMS system. Targets on the hydro scheme are currently under review with SEPA to comply with the Water Framework directive.

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6 Stakeholders

The following stakeholders are associated with the water management plan:

- Spey Fisheries Board
- Lochaber Fisheries Trust
- SEPA
- SNH
- Ben Nevis Distillery
- Inverlochy Castle Hotel
- Nevis Range
- Forestry Commission
- Corroul Estate
- Ardverich Estate
- Glenshero Estate
- Marine Scotland
- Kinlochleven Community Trust
- Network Rail


As well as those above, Alvance British Aluminium have partnered with various stakeholders on the River Spey, including the Spey Fishery Board, Spey Catchment Initiative and Nature Scot in relation to habitat protection and enhancement. Recommendations provided by these stakeholders are taken into account to ensure the hydro infrastructure has a limited impact on the surrounding environment. This collaboration has allowed ABA to benefit from expert insight of industry professionals, with improvement works so far including fish pass upgrades, smolt trapping surveys, and upper course river restoration.

7 Bibliography & References

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8 Appendices

8.1 Appendix A Location & Catchment Maps



Figure 8-2 Location Plan

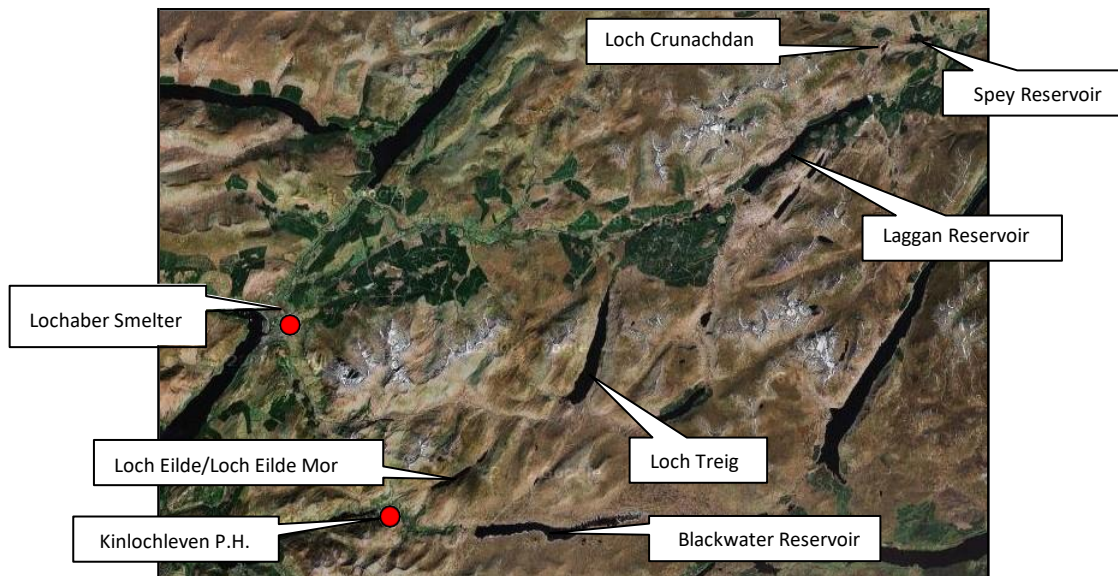


Figure 8-1 Catchment Satellite Image

8.2 Appendix B GFG Lochaber Groundwater Maps

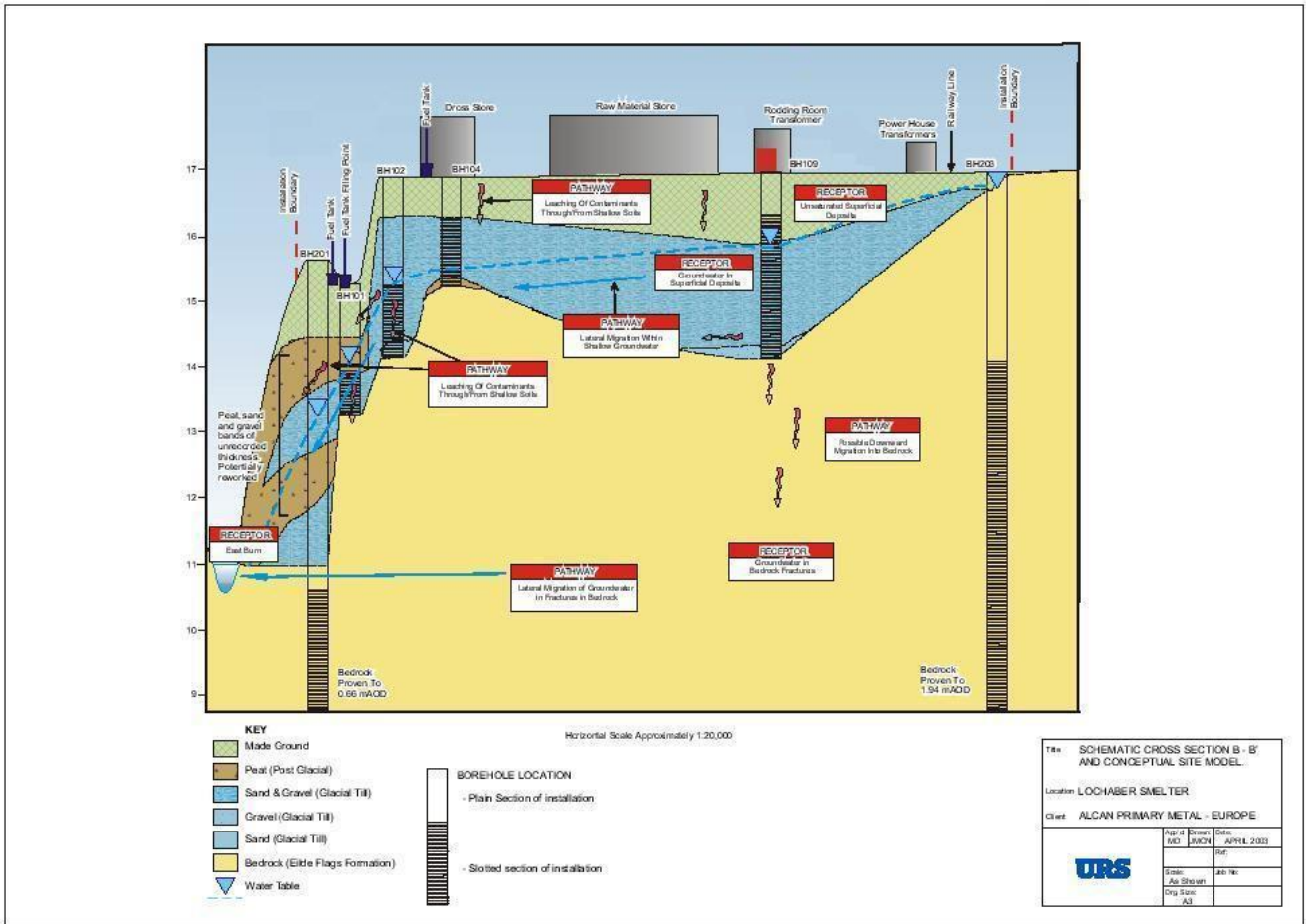





Figure 8-3 Smelter Groundwater Pathway/Receptor Diagram

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8.3 Appendix C Spey SAC Site Details

Table 11 River Spey SAC

Country	Scotland
Unitary Authority	Highland; Moray; Perthshire
OS Grid Reference	NJ095319
Latitude	57 22 15 N
Longitude	03 30 00 W
SAC EU Code	UK0019811
Status	Designated Special Area of Conservation (SAC)
Area	5729.48

Table 12 River Spey Habitat Types.

Habitat	Percentage Area Cover
Inland water bodies (standing water, running water)	60
Bogs. Marshes. Water fringed vegetation. Fens	11
Heath. Scrub. Maquis and garrique. Phygrana	1
Humid grassland. Mesophile grassland	15
Improved grassland	4
Other arable land	1
Broad-leaved deciduous woodland	5
Coniferous woodland	1
Mixed woodland	1
Other land (including towns, villages, roads, waste places, mines, industrial sites)	1

8.3.1 Annex II species that are a primary reason for selection of this site

8.3.1.1 1029 Freshwater pearl mussel *Margaritifera margaritifera*


The River Spey is a large Scottish east coast river that drains an extensive upland catchment and supports an outstanding freshwater pearl mussel population in its middle to lower reaches. In parts of the River Spey, extremely dense mussel colonies have been recorded (225 m²) and the total population is estimated at several million. As the population also shows evidence of recent recruitment and a high proportion of juveniles, the River Spey is considered to support a pearl mussel population of great international significance.

8.3.1.2 1095 Sea lamprey *Petromyzon marinus*

The River Spey represents the sea lamprey *Petromyzon marinus* in the northern part of its range in the UK. It is absent from rivers north of the Great Glen, and the River Spey is virtually at the northern limit for this species. Recent surveys show that sea lamprey larvae are widely distributed throughout the middle and lower reaches of the river, where the particularly fast-flowing waters of the River Spey provide ideal spawning conditions for this species. In addition, as an unpolluted and relatively little modified system, the River Spey matches the other key habitat requirements of the sea lamprey in terms of good water quality, clean gravels and marginal silts and an unhindered migration route to the sea.

8.3.1.3 1106 Atlantic salmon *Salmo salar*

The Spey supports one of the largest Atlantic salmon *Salmo salar* populations in Scotland, with little evidence of modification by non-native stocks. Adults spawn throughout virtually the whole length of the river, and good quality nursery habitat is found in abundance in the main river and numerous tributaries. Salmon in the Spey system are little affected by artificial barriers to migration, and the waters in the catchment are largely unpolluted (the river is oligotrophic throughout its length). For a system of its size, the Spey is also relatively free from flow

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modifications such as abstractions, diversions and impoundments. The salmon population includes fish of all ages including migrating smolts and returning adults, possibly reflecting genetic differences within the Spey stock.

8.3.1.4 1355 Otter *Lutra lutra*

The Spey represents an important otter *Lutra lutra* site in Scotland, with good quality freshwater habitat. Surveys have identified high levels of otter presence throughout the Spey catchment. Riverine habitat features which are known to be important to otters are present, such as reedbeds and islands, and populations of important prey species are relatively healthy. The persistence of a strong population of otter on this river indicates that habitat conditions are particularly favourable for the survival of the species.

8.6 Appendix F Water Balance

Lochaber Smelter 2023

