



RAF Lossiemouth Drainage/Long Sea Outfall



MINISTRY OF DEFENCE

Defence Infrastructure Organisation

Proposed Mitigation in Principal

July 2020

Town & Country Planning
(Scotland) Act, 1997
as amended

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Development Management
Environmental Services
The Moray Council

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Contents

Glossary	3
1.0 Introduction	4
1.1 Background	4
1.2 Site Location.....	4
1.3 Existing Site Information	4
1.4 Development Proposals	5
1.5 Purpose and Structure of the Report	8
2.0 Methodology	8
2.1 Desk Study	8
3.0 Mitigation	9
4.0 References	14

Glossary

CIEEM	Chartered Institute of Ecology & Environmental Management
DIO	Defence Infrastructure Organisation
GradCIEEM	Graduate Member of Chartered Institute of Ecology & Environmental Management
Habitats Regulations	Conservation of Habitats and Species Regulations 2017
HRA	Habitats Regulations Appraisal
MCIEEM	Member of Chartered Institute of Ecology & Environmental Management
RAF	Royal Air Force
SEPA	Scottish Environmental Protection Agency
SPA	Special Protection Areas
SNH	Scottish Natural Heritage

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The Moray Council



1.0 Introduction

1.1 Background

WYG was commissioned by the Defence Infrastructure Organisation (DIO) to prepare a report to inform Habitats Regulations Appraisal (HRA) for a proposed development at the site known as RAF Lossiemouth, Moray, Scotland. The specific areas proposed for development are detailed within the Masterplan (Drawing No. A089116-69-1 LDP(SITE)00-2001 Rev G). **This document does not consider the Drainage Project Contractor's Compound, which has been separately dealt with and works completed.**

This report has been prepared by WYG Project Ecologist Lorna McRae Grad CIEEM and the conditions pertinent to it are provided in Appendix A.

1.2 Site Location

The site is located at the north western edge of Lossiemouth town in Moray, north-east Scotland, IV31 6SD, centred at Ordnance Survey National Grid Reference NJ 21421 70691. The site is located at the coast, with the pipeline to be constructed over onshore terrestrial habitats and offshore intertidal and marine habitats (see Figure 1 Site Location Plan).

The Lossiemouth Development Plan (LDP) drainage site comprises a golf course with grasslands, dune heath, scrub and bare ground. The drainage site also includes a small section of grassland located within the north of Royal Air Force (RAF) Lossiemouth site boundary. The site extends beyond the golf course to the shoreline which transitions from dune habitat to pebble and sand substrate, into the marine habitat – the Moray Firth. The Long Sea Outfall (LSO) discharge point is located 820m off-shore from the last on-shore manhole.

The wider area surrounding the air base is a low lying, exposed coastal region on the edge of the Moray Firth consisting predominantly of a mosaic of farmland and small woodland compartments. Larger expanses of woodland lie to the east and south of the site, as does Lossiemouth town.

1.3 Existing Site Information

WYG and select sub-contractors have completed extended Phase 1 habitat and additional ecology surveys at the site plus supporting assessments. The results are provided in the following reports and the recommendations are summarised within this document:

- WYG (2019a) *RAF Lossiemouth Development Programme: Ecological Appraisal*. Defence Infrastructure Organisation.
- WYG (2019b) *RAF Lossiemouth Development Programme: Reptile Survey Report*. Defence Infrastructure Organisation.
- WYG (2020) *RAF Lossiemouth Development Programme: Draft Shadow Habitats Regulations Appraisal*. Defence Infrastructure Organisation
- Pelagica (2019a) *RAF Lossiemouth Development Programme: Marine Ecology Desk Review*. Defence Infrastructure Organisation
- Pelagica (2019b) *RAF Lossiemouth Marine Ecology Supplementary Assessment: Atlantic Salmon and Sea Trout*. Defence Infrastructure Organisation

RAF Lossiemouth Drainage/Long Sea Outfall: Proposed Mitigation in Principle



- Pelagica (2019c) *RAF Lossiemouth Marine Ecology Supplementary Assessment: Sandbanks*. Defence Infrastructure Organisation
- Pelagica (2020a) *Marine Ecology Supplementary Assessment: Noise*. Defence Infrastructure Organisation.
- Pelagica (2020b) *Marine Ecology Supplementary Assessment: Commercial Fisheries*. Defence Infrastructure Organisation.

1.4 Development Proposals

The purpose of the scheme is to improve the surface water and foul sewerage drainage system at the RAF Lossiemouth site, as the Scottish Environment Protection Agency (SEPA) have raised concerns regarding de-icer entering Covesea Burn and have advised that the current drainage system must be addressed. At present effluent from three treatment plants and surface water discharge into the Covesea Burn which runs across the coastal golf course to the sea. The proposed scheme will result in two wastewater treatment plants closing and a new wastewater treatment plant being installed. All effluent and surface water from the airfield will then pass via a new Long Sea Outfall (LSO) to discharge into the marine environment approximately 800m from the shore. An attenuation tank will be installed to control surface water discharge to the pipe, and stormwater flows from this will pass into the Covesea Burn as at present. Detailed design drawings are provided in Figure 2.

1.4.1 Proposed Scheme

The proposal considered in this document is the installation of the following facilities within the RAF Lossiemouth boundary and across the adjacent Moray Golf Course and shoreline into the sea (see Figure 2). The primary purpose of the scheme is to avoid drainage of foul water to Covesea Burn, and to treat wastewater in the first instance before discharging via a LSO into the Moray Firth.

Summary of Proposed Works:

- Flows upstream of the proposed Covesea Burn Weir (diversion) structure are to be directed to the proposed long sea outfall via the attenuation tank;
- Attenuation tank is sized to capture first flush flows (first 5mm rainfall);
- Once tank fills the flows shall be directed over the Covesea Burn Weir and flow down the Covesea Burn as it currently does;
- Any drainage outlets downstream of the weir shall remain discharging to the Covesea Burn, with the exception of the package treatment plant outlet at Building 200 which is to be transferred to the proposed wastewater treatment works;
- Any new storm (road) drainage under the drainage project is being directed to the Covesea Burn, to discharge downstream of the weir.

The main areas of the works are broken down into six sections:

1. **Aircraft Lavatory and Water Truck Disposal & Fill Point** – this will be a dedicated area required to serve the aircraft water and wastewater trucks (specialist trucks for potable water supply and wastewater removal). This blue waste shall not enter the drainage system as shall be held in a storage tank and then tankered off-site to a specialist waste disposal facility.

RAF Lossiemouth Drainage/Long Sea Outfall: Proposed Mitigation in Principle



2. **Proposed Foul Drainage** – as there is limited foul drainage infrastructure to the north side of the runway, a new foul drainage system is proposed to pick up the new facilities and a number of existing buildings. This foul water system will involve new gravity and pumped systems discharging to the proposed Wastewater Treatment Works (WwTW). The final effluent is to be directed to the proposed site (onshore) drainage system (as detailed within Figure 2).
3. **Proposed Waste Water Treatment Works (WwTW)** – a new WwTW to be installed on the northern side of the Station to serve existing and new foul water facilities. A process and arrangement methodology has been developed which should not be altered as it has been agreed with DIO and SEPA.
4. **On-Shore Covesea Burn Diversion** – design for this portion has been significantly developed as it is integral to other parts of LDP and to allow the SEPA CAR licence¹ to be progressed. Therefore, the hydraulic design for this portion shall not be adjusted. This element has been designed both within and outwith the RAF boundary.
 - **Onshore within the RAF Boundary** - Detailed design has been developed for this element of the works, consisting of (from upstream to downstream):
 - a. A diversion structure with an overflow arrangement which directs excess flows into the existing Covesea Burn;
 - b. A silt trap manhole between the diversion structure and attenuation tank;
 - c. The attenuation tank will be a Weholite piped system, which will be built up from 1200mm diameter parallel runs. The attenuation tank will be set at a level to mitigate impact on water level in Covesea Burn;
 - d. A HydroBrake flow control will be fitted downstream of the attenuation tank. Flow control is required to limit flows and potential headlosses (differences in pressure) generated on the downstream system;
 - e. A Klargestor Full Retention Separator shall be installed on the storm drainage run downstream of the flow control. A layby shall be constructed to service the retention separator;
 - f. Final effluent connection from the WwTW shall connect to the storm drainage system prior to leaving the station (downstream of the retention separator).
 - **Onshore beyond the RAF boundary** - detailed design has been developed for this element of the works (drainage pipeline is to continue to the shoreline from the Station), consisting of (from upstream to downstream):
 - a. A drainage pipeline to continue to the shoreline from the station predominantly within the Moray Golf Club grounds;
 - b. A section of pipeline is to cross the public roadway (B9040), before crossing back into golf club grounds.
5. **Offshore Long Sea Outfall** – As this is integral with the on-shore drainage and achieving SEPA requirements again the hydraulic design should not be altered. A 600 mm diameter LSO shall extend 820 m into the Moray Firth from the outfall manhole (the last manhole located within the 'onshore, beyond the RAF boundary' section). Maximum allowable headloss generated between the LSO from manhole S1 to end of outfall pipe including diffusers arrangement is 1.8 m at 153 l/sec. This is on the basis of tide level of 3.18 m AoD.
6. **Proposed Maintenance Road** – there is a requirement to provide a new road system to allow maintenance of the proposed new infrastructure.

¹ Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended), or CAR.

RAF Lossiemouth Drainage/Long Sea Outfall: Proposed Mitigation in Principle



The design will be carried out in accordance with all relevant British Standards, Scottish Environment Protection Agency (SEPA), Moray Council, Aquatrine, Veolia and all other statutory Authority and public utility requirements and will achieve all necessary approvals and consents prior to commencement of construction.

1.4.2 Construction Phase

The detailed design of and construction methodology can only be fully determined upon appointment of the contractor (e.g. pipe laying method). As such, **this assessment is based on the available design/construction methodology that can be determined at this stage** (with knowledge of the proposed location of the outfall pipe and the nature of the seabed etc).

The scheme will be constructed April to September 2021 (inclusive) with the offshore portion of the works to be undertaken between April and August 2021 (as the weather conditions are likely to be more favourable).

Construction Onshore

An open trench method will be used to excavate, install the pipeline, and backfill with suitable material. This will affect a corridor of approximately 20 m wide across the sand dunes of the Moray Golf Course and out over the shoreline/intertidal area into the Moray Firth.

The construction activities for the onshore facilities have not been fully finalised to date; however, given the scope of the works and hydrological connectivity to the designated sites, the construction for sections within the tidal zone and below low tide are considered most significant and of higher priority for the purpose of this assessment. The full design and construction methodology will be provided by the contractor, and if necessary the HRA will be amended to take account of the proposals.

Construction Within the Tidal Zone

Construction within this area will be undertaken during low spring tide cycle using multiple excavators operating along the tidal zone simultaneously to excavate a trench to the required depth to allow for the 710mm OD PE MDPE SDR (Outer Diameter Poly Ethylene Medium Density Polyethylene Pipe Standard Dimension Ratio) pipe installation. The trench will be backfilled with suitably excavated materials.

Construction Below the Tidal Zone

Laying of the proposed pipeline below the surface of the water will be undertaken using a dredger ahead of bringing the pipe into position. Where rock is present along the pipe route, this will be broken out using long reach equipment. It has been confirmed that the rock layer is a weak layer of weathered rock and it is anticipated that an excavator and dredger will be sufficient to remove the rock without the use of drilling.

The pipeline will consist of one singular piece or else pipe sections welded together at a suitable location. From the pipe assembly site onshore the pipe will then be floated into position. Floats will be removed in sections; collars will be fixed to the pipeline and long reach equipment used from a

RAF Lossiemouth Drainage/Long Sea Outfall: Proposed Mitigation in Principle



barge to allow positioning and backfill of the pipeline below the water level. The temporary buoyancy pipe will then be recovered to shore.

1.4.3 Operational Phase

Foul Sewerage System

The new foul drainage system is proposed to pick up the new facilities and a number of existing buildings. It will involve new gravity and pumped systems discharging to the proposed WwTW. The final effluent is to be directed to the proposed onshore drainage system prior to discharging via the LSO.

Storm Drainage System

The proposed surface water drainage solution has been developed to allow run-off containing de-icer to be captured and discharged into the Moray Firth at a suitable location away from the shoreline via the proposed LSO pipeline. The onshore element of the drainage design has been substantially developed as other LDP elements are interlinked and required certainty for design of these elements.

The flows presently entering the Covesea Burn from Oil Interceptor 47 (upstream) are to be diverted into a storm water attention tank. Downstream of the tank is a flow control to limit flows being directed downstream to the LSO. Between the flow control and the shoreline, the gravity storm sewer will traverse the northern end of the station, Moray Golf Club grounds and cross under a public road.

Adequately developed design has been produced for portions of the drainage proposals to allow a CAR licence submission to SEPA, therefore the hydraulic design for these elements shall not be altered. During operation it is expected that surface water drainage from hard standing will also be diverted from Covesea Burn.

1.5 Purpose and Structure of the Report

The objective of this report is to highlight ecological constraints identified from previous reports within the RAF Lossiemouth site and provide an overview of the recommended management and 'Mitigation in Principle' of ecological receptors on site, with reference to the development proposals, that is considered to be required for the consideration of contractors to include within method statements for the works.

2.0 Methodology

2.1 Desk Study

A review of recommendations within the reports noted in Section 1.3 was undertaken and the results summarised in Section 3.





3.0 Mitigation

Details of mitigation required for each receptor is identified in Table 1.

Table 1: Mitigation in Principal Relating to Each Ecological Receptor

Receptor	Constraint / Risk	Source Report	Mitigation
General aquatic habitats and fauna / best practice	Reduction in water quality. Pollution of the freshwater/marine environment (chemical) i.e. Pollution event. Pollution to freshwater/marine environment (physical) i.e. sediment disturbance, suspended solids and sedimentation	- WYG, 2020	Standard SEPA GPP/PPGs will be employed: <ul style="list-style-type: none"> • PPG 1: Understanding your environmental responsibilities – good environmental practices; • GPP 5: Works and maintenance in or near water; • PPG 6: Working at construction and demolition sites; • PPG 7: Safe storage – The safe operation of refuelling facilities; • GPP 21: Pollution incident response planning; and • GPP 22: Dealing with spills.
Terrestrial habitats (including important coastal habitats)	Loss of habitats	- WYG, 2019a	A suitably qualified Ecologist / Landscape Manager to advise on maintaining the dynamics of coastal dune systems through development, will require to define appropriate measures within a Habitat and Landscape Management Plan . All habitats across the LDP LSO/drainage site should be avoided / retained / reinstated .
Aquatic habitats (sandbanks which are slightly covered by sea water all the time)	Direct or indirect loss of habitat which forms or supports qualifying features	- WYG, 2020, - Pelagica, 2019c.	A detailed assessment of the nature of the substrate and proximity of proposed works to the designated sandbank features has been undertaken. This identified that sandbank features are not present within the footprint of the site. Therefore no specific mitigation for this feature.

RAF Lossiemouth Drainage/Long Sea Outfall: Principle



Proposed Mitigation in

	Degradation or destruction of habitats during removal of substrate. Temporary habitat loss of sandbank features.		
Nationally scarce botanical species (associated with Moray and Nairn Coast Ramsar)	Direct or indirect loss of functionally linked habitat.	- WYG, 2020	Pre-commencement survey will be undertaken to identify and relevant species within the footprint of the site. A Habitat and Landscape Management Plan (HLMP) has been submitted in draft form which includes details for the translocation of relevant species (if required).
Common bottlenose dolphin <i>Tursiops truncatus</i> (and other cetaceans)	Noise and/or vibration disturbance from plant / machinery on common bottlenose dolphin. Visual Disturbance	- WYG, 2020 - Pelagica, 2019a	A Marine Mammal Observer (MMO) will be present for the construction and installation of the coastal and offshore sections of pipeline. The MMO Method Statement followed for the geotechnical investigations shall be updated and sent to SNH for comment/approval. A generous mitigation zone of 500m from the works will be adopted and should any qualifying species approach or be noted within this zone, all works will be halted. The MMO pre-works search will be carried out for a minimum of 30 minutes before work commences ; no works will start until the mitigation zone is clear of species. In addition, if necessary soft start methods will be adopted as works commence which will alert species of any activity and allow them to move away before any risk of damaging noise or vibration. A European Protected Species Mitigation Licence will also be obtained for disturbance.

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RAF Lossiemouth Drainage/Long Sea Outfall: Principle



Proposed Mitigation in

Overwintering pSPA species (except Eider duck)	Temporary direct habitat loss of designated land /coastal habitats during construction phase (plant / machinery within the designated site footprint rendering it unusable by qualifying species).	- WYG, 2020	The timing of the works will be April – September and will therefore avoid any impact for temporary loss of habitats and disturbance for non-breeding over wintering SPA birds.
Eider duck	Noise from plant / machinery resulting in avoidance behaviour (disturbance).	- WYG, 2020	Eider duck will be protected from significant disturbance by being within the remit of the MMO and will be subject to similar soft start methodologies as the bottlenose dolphins.
Fish species (Atlantic Salmon, sea trout, sea lamprey)	Noise disturbance from construction plant / machinery resulting in avoidance behaviour (disturbance).	- WYG, 2020	Avoidance of any type of piling operations during pipeline installation. Should harder rock be present then only vibration piling will be allowed with soft start .
Commercial Fisheries	Disruption of spawning events of key commercial species due to physical and noise disturbance	- Pelagica, 2020b	Works are timed to occur between April and September and as such, will fall outside the main spawning period for all commercially important species in the area. The works will fall within the late spawning season for Atlantic cod <i>Gadus morhua</i> ; however, at this stage, it is anticipated that no eggs will be being laid (this peaks in February – March) and only juvenile fish will remain, which are mobile and can escape any noise or physical disturbance. Similarly, the works will fall outwith any key habitat areas for other important species such as plaice <i>Pleuronectes platessa</i> and sandeel <i>Ammodytidae</i> which favour sandy substrates as nursery grounds.

RAF Lossiemouth Drainage/Long Sea Outfall: Principle



Proposed Mitigation in

Atlantic salmon	Noise disturbance from construction plant / machinery resulting in avoidance behaviour (disturbance).	- Pelagica, 2020a - Pelagica, 2019	Seasonal avoidance of work within the marine environment to avoid the most sensitive period for Atlantic salmon from June to July when smolt are migrating offshore, and then in the autumn when mature salmon return to natal rivers to spawn.
Otter	Noise disturbance from construction plant / machinery resulting in avoidance behaviour (disturbance).	- WYG, 2020	A pre-construction survey is to be undertaken to identify any otter features (i.e. holts or couches) within the onshore section, and an MMO to identify any using the marine habitat.
Herpetofauna	Direct mortality / disturbance / loss of habitat	- WYG, 2019b	It is recommended that groundworks are preceded by a search of refugia in each area. It may be deemed necessary to conduct a supervised 'destructive search' (i.e. a scrape of the vegetation immediately above the topsoil) prior to commencing works, for overgrown/highly suitable areas. All works should be supervised by a suitably experienced Ecological Clerk of Works (ECoW) .
Great crested newt	Direct mortality / disturbance / loss of habitat	- WYG, 2019a	If GCN are recorded within 500m of the site, additional surveys, licensing and mitigation measures may be required, to be determined in consultation with SNH. They have not been recorded within 500m of site during dedicated surveys to date; however, vigilance should be maintained throughout works.
Foraging and commuting bats	Disturbance / loss of habitat	- WYG, 2019a	Night time work should be avoided to prevent artificial light spill onto suitable habitat. If this is not feasible then a sensitive lighting scheme should be implemented in consultation with an ecologist.
Badger	Direct mortality / disturbance / loss of habitat	- WYG, 2019a	A pre-construction survey for badgers is recommended, of the on-shore area at least three months prior to works. The requirements for mitigation and avoidance should be updated following pre-construction survey for badgers.

RAF Lossiemouth Drainage/Long Sea Outfall: Principle



Proposed Mitigation in

Nesting birds	Direct mortality / disturbance / loss of habitat	- WYG, 2019a	Works on site should be undertaken outside of the bird nesting season (March to September, inclusive) , where possible, or alternatively a nest check by a suitably qualified ecologist no more than 48 hours prior to works commencing. Suitable working methods shall be advised accordingly should an active nest be identified. The reinstatement of any suitable nesting habitat should any be removed.
General / other species	Direct mortality / disturbance / loss of habitat	- WYG, 2019a	General 'reasonable avoidance' mitigation measures should be implemented during works: <ul style="list-style-type: none"> • Capping of pipes; • Installation of ramps within excavations ; and • HLMP.
Invasive species	Introduction of non-native invasive plant and/or animal species during construction and movements of plant/ machinery	- WYG, 2019a - WYG, 2020	A pre-commencement survey for invasive species is recommended during the active growing season (April-September inclusive). Standard PPGs (1, 6, 7) and GPPs (5, 21) should be employed throughout works.

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4.0 References

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