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1.0 PROJECT DESCRIPTION

The Rockcliffe Bathing Waters (BW) project shall address the continuous wastewater effluent being discharged from the local Kippford Wastewater Treatment Works (WwTW) during peak season to the Solway Firth. The driver for this project is to improve the Rockcliffe BW quality as the waters have not met the standards since 2016. Kippford is a small coastal town located within Dumfries and Galloway, approximately 7 km south of Dalbeattie. The new proposed WwTW will be constructed approximately 1 km north of the existing works. The new WwTW will include a final effluent outfall into the Urr Water and a surface water outfall to the adjacent mudflats shown in Figure 1 - Proposed WwTW Overview.

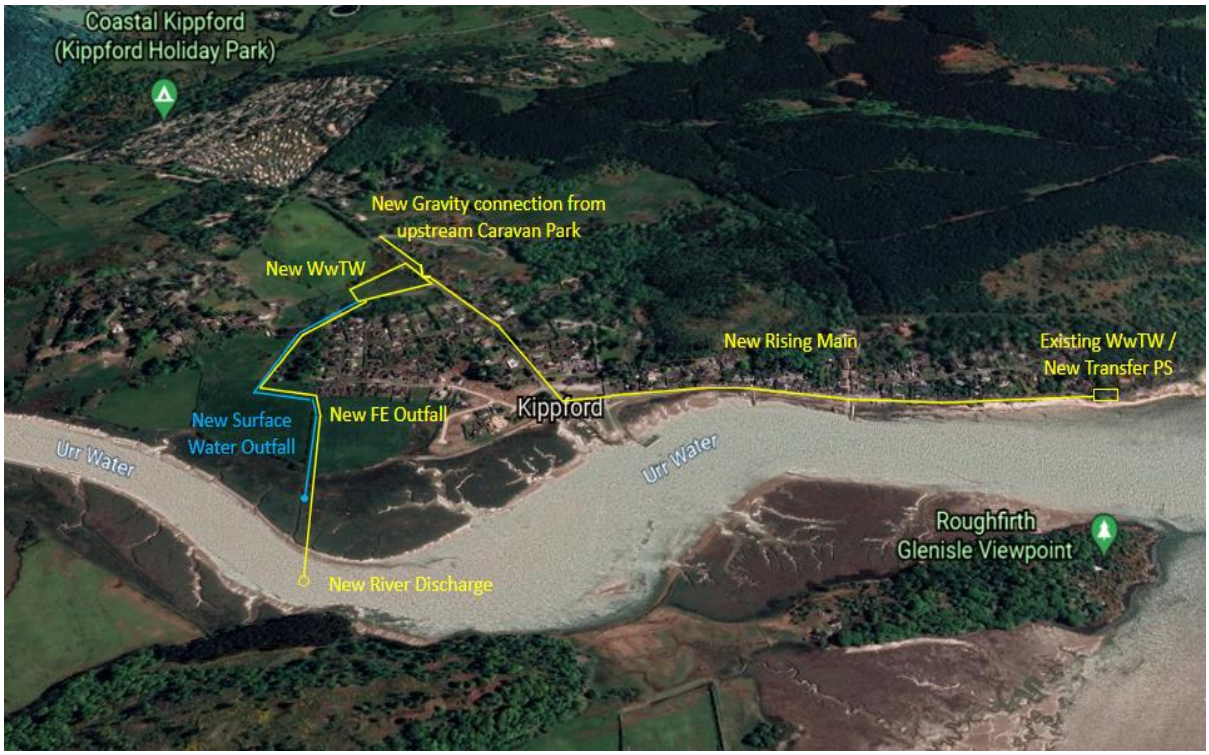

Figure 1 - Proposed WwTW Overview

The final effluent outfall will continuously discharge treated effluent to the tidal waters. SEPA requires all new continuous discharges to demonstrate compliance with environmental policies and Environmental Quality Standards (EQS). Figure 2 - Final Effluent Discharge Point shows the discharge point of the final effluent outfall to the Urr Water located in the channel centre at 54°52'57"N, 003°49'19". Initial Dilution (ID) and mixing zone / EQS modelling was carried out to determine this location.

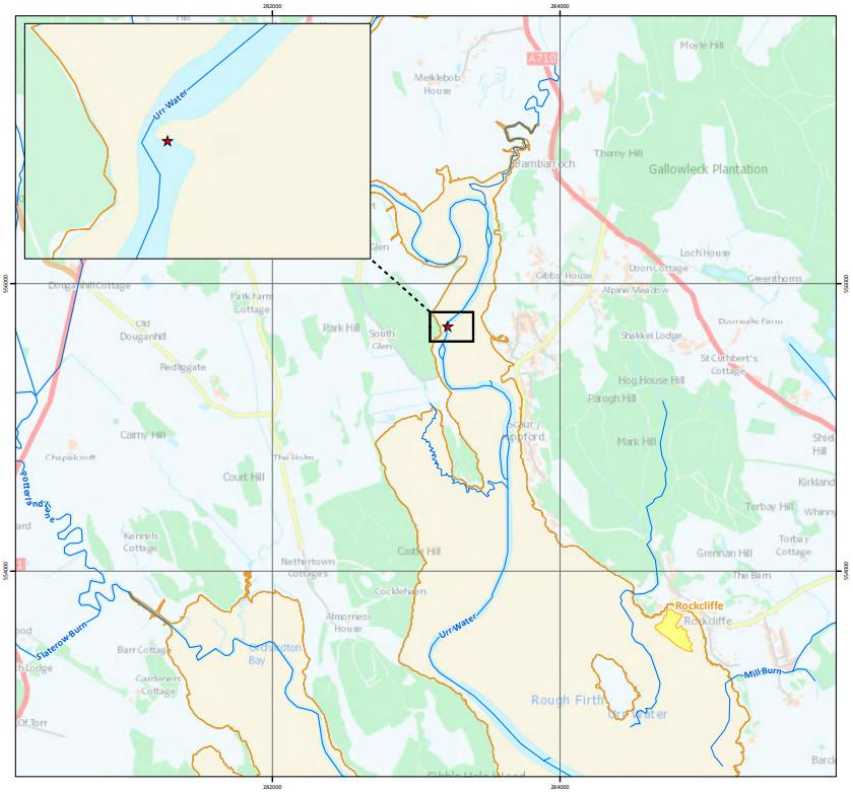

Figure 2 - Final Effluent Discharge Point

2.0 SCOPE OF WORKS

The marine section of the project consists of two main sections: the surface water outfall and the final effluent outfall.

The surface water outfall collects drainage water from the WwTW area through a drainage network that discharges into the mudflats. A head wall will be constructed at the discharge point.

The final effluent outfall will consist of a pipeline from the WwTW that will run under the mudflats and connect to a concrete structure positioned in the Urr Water. A non-return valve will be installed at the end of the pipe within the structure to prevent river water flowing back into the pipe.

The site is accessed from an existing track adjacent to the proposed new WwTW. This track provides access to the fields highlighted in Figure 3 - Site Location where the outfall lines pass through before entering the mudflats area.

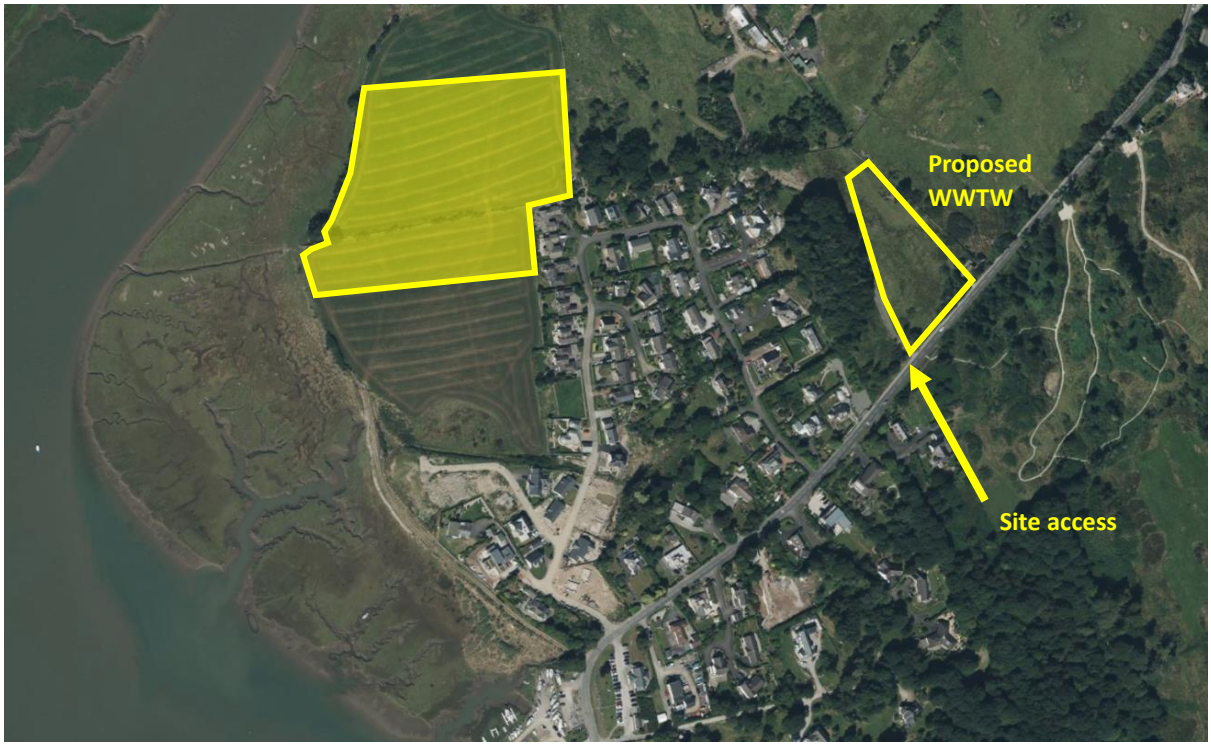

Figure 3 - Site Location

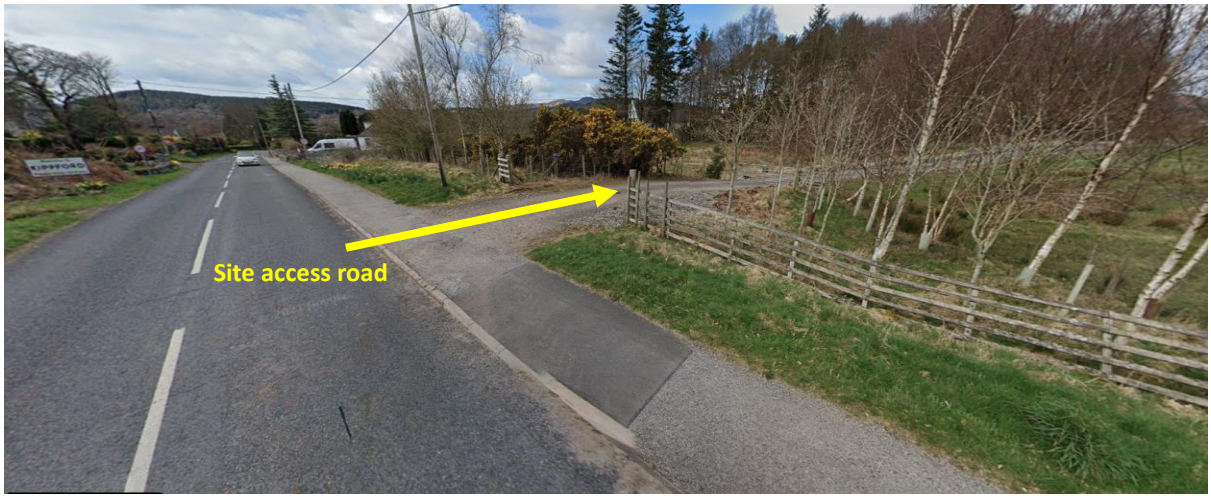

Figure 4 - Site Access

2.1 SURFACE WATER OUTFALL

2.1.1 Pipe route

The surface water route is detailed in drawing 5XXXXXXXXX-WW-DRA-04140215. The section of pipe below MHWS is 0.5m in length as the discharge point is at the edge of the fields as indicated in Figure 1 - Proposed WwTW Overview.

2.1.2 Headwall

The surface water discharge point will be secured by a headwall arrangement as shown below in Figure 5 – Headwall Overview and detailed in drawing 5XXXXXXXXX-WW-DRA-04140216. The pipe end will be fitted with a non-return valve to prevent reverse flow within the pipe when the mudflats are flooded and any other ingress into the pipe.

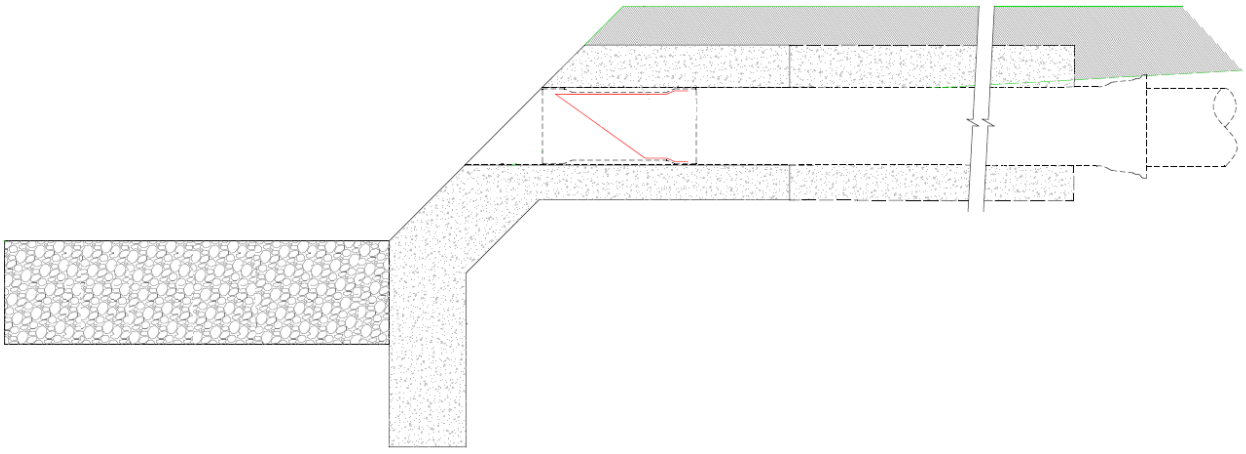

Figure 5 - Headwall Overview

2.2 FINAL EFFLUENT OUTFALL

2.2.1 Pipe route

The final effluent outfall route is also detailed in drawing 5XXXXXXXXX-WW-DRA-041810215.

The depth and trajectory of the outfall pipe will depend on the method of construction. Horizontal Directional Drilling will result in a greater installation depth relative to an open cut method due to the required drill trajectory and to ensure no pipe floatation.

2.2.2 Outfall structure

The proposed outfall structure is a concrete precast dome. This will surround the vertical pipe section that will protrude from the riverbed and protect the outfall pipe from vessels and debris. An overview of this structure is shown below in Figure 6 - Outfall Structure Overview with further detail provided in drawing 5XXXXXXXXX-WW-DRA-04140217.

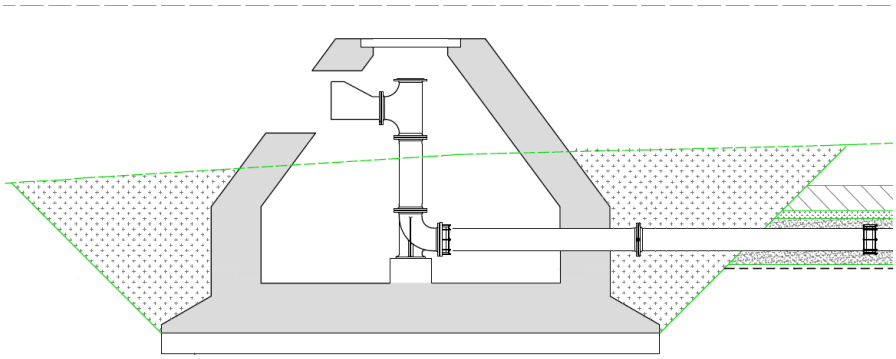

Figure 6 - Outfall Structure Overview

3.0 INSTALLATION METHOD

Two construction methods are under consideration for the final effluent outfall pipe crossing the mudflats and the outfall structure that is positioned in the Urr Water. Horizontal Directional Drilling (HDD) and Open Cut are the methods proposed.

Engagement with contractors to finalise construction details is currently underway after initial feasibility assessments were carried out. On completion of contractor discussions detailed design documentation and construction methodology can be provided. This information will supplement the outline methodology below and give further clarity on the construction phase.

HDD is the preferred construction method due to the reduction in material removed from the mudflats and time required to carry out the work. This minimises the environmental impact to the area and disruption to residents. The quantities of material removed and deposited below MHWS due to the outfall works is based on the Open Cut method as this has the largest impact on the areas affected.

3.1.1 Horizontal Directional Drilling

A launch pit will be established in the southern field highlighted in Figure 3 - Site Location. The drilling rig will be fixed into position using temporary piles and an approximate 5m x 5m cofferdam formed within the Urr Water at the proposed outfall location to serve as a receiving pit. A barge positioned adjacent to the final effluent discharge location will serve as a platform from which the sheet piling can be installed to form the cofferdam. Once the cofferdam has been formed this platform will also facilitate operations to install the outfall structure (Figure 6 - Outfall Structure Overview.

A pilot hole will be drilled from the launch pit to the cofferdam in the Urr water, this pilot hole will not penetrate the seabed. Once the pilot hole is established a full bore can then be drilled into the cofferdam. The outfall pipe will then be pushed from the launch pit into the cofferdam to form the pipe route.

Seabed material will be removed from within the cofferdam and a concrete base will be formed in this location. The precast concrete outfall structure will then be lifted into place from the barge at the cofferdam. Final connection of the pipe to the outfall structure and non-return valve will be carried out by divers. Scour protection in the form of rip rap will then be placed around the circumference of the outfall structure shown in drawing 5XXXXXXXXX-WW-DRA-04140217.

3.1.2 Open Cut

If the open cut method is adopted, soft ground/amphibious excavators will be utilised to cut a trench across the mud flats to allow pipe installation based on the route shown in drawing 5XXXXXXXXX-WW-DRA-041810215. As the trench is dug, sheet piling will be installed by an excavator to support the trench. Dewatering the trench will be carried out on a continuous basis and silt separation employed prior to returning the water to the river. A discharge licence will be obtained prior to this operation.

After the trench has been formed it will be partially infilled with granular bedding material, shown in drawing 5XXXXXXXXX-WW-DRA-04140217. The bottom half sections of the anchor weights will be lifted into position.

Pipe sections will be butt-fusion welded together in a tented area set up over the trench. Sections will be fused together and rolled directly into the trench before the tented area and fusion welding equipment is moved along the pipe route to complete the next sections. The pipe sections will be pressure tested prior to the upper concrete anchor weights being lifted into place and the remaining pipe bedding material added.

A 3m working corridor on either side of the pipe trench will be required for plant equipment and personnel. Bog mats will be laid at the working area to minimise risk of plant sinking, damage to the mudflats and improve ease of access.

The sheet piles will be removed by an excavator and the area backfilled when sections have been completed. The aim will be to minimise removal of material from the mudflats to reduce the impact to the area.

3.1.3 Surface Water Outfall

The section of surface water outfall pipe below MHWS will be installed using a similar Open Cut method to the final effluent pipe. An excavator will form a trench in which the pipe concrete surround will be placed as shown in Figure 5 – Headwall Overview. The length of pipe below MHWS (0.5m) will be in a concrete surround. As-dug material will then be used as infill and tie into the existing ground profile.

An excavator will be used at the pipe discharge point to allow installation of a concrete headwall. This will be a precast section that can be lifted into place. Ground/bog mats will be placed at the edge of the mudflats for the transport of the precast headwall. The wall will then be lifted at the edge of the mudflats into position. Rip rap scour protection will also be placed directly below the discharge point as detailed in drawing 5XXXXXXXXX-WW-DRA-04140216. The in-line valve will be installed within the outfall pipe. As-dug material will be used to infill and tie into the existing ground profile at the headwall location.

4.0 ENVIRONMENTAL MITIGATION

An ecological constraints survey was conducted in January 2022 to understand the environmental factors to be considered when conducting any construction work at the proposed site. The report from this survey recommended the use of low ground pressure tracked vehicles within the mudflats area and the formation of a minimal working corridor to limit the impact of the works on this habitat.

It was recommended the construction of the outfall and pipeline within the mudflats are undertaken out with the wintering bird season of nominally October to March. The report also recommended, where possible, to avoid in channel work during the migration period for salmonids. The Galloway Fisheries Trust and Urr District Salmon Fisheries Board confirmed the sensitive timing are the salmon smolt run of late April to mid-May and adult upstream migration of July to October. The free passage of fish in the channel will be maintained during works.

Considering the points above it is proposed to conduct the outfall works from mid-May to the end of June. Water flows are also anticipated to be lower at this time of year simplifying construction work and therefore minimising disruption.

Undertaking the outfall works in the summer would also avoid potentially encountering any overwintering wader or waterfowl birds using the intertidal habitats for foraging or roosting. However, as the works are discrete and there is plentiful surrounding potential overwintering habitat it is not envisaged that this would prevent works between the October to March. The closest statutory nature conservation designations for overwintering birds are Solway Firth SPA over 4km from the proposed outfall location and the Solway Firth SAC/ SPA/ Ramsar approximately 6km from the outfall location. Given these distances it is not expected that works would cause ex situ wader or wildfowl disturbance associated with these designated sites.

Outfall works below the Mean High Water Springs (MHWS) will only commence when a Marine Scotland licence has been obtained. Pollution prevention measures will be implemented to negate adverse impacts to marine habitats in line with Scottish Environmental Protection Agency (SEPA) Guidance for Pollution Prevention (GPPs).

5.0 HEALTH AND SAFETY

Effective management of health and safety is critical to the success of the project. Throughout the duration of work all relevant areas will be enclosed with secure fencing.

Works will be controlled through a permit to work system with all contractors to sign on and off the necessary permits each day. Site safety inductions and regular toolbox talks will be conducted to ensure all personnel understand the construction methodology for each operation and to ensure effective communication between all stakeholders.

Risk Assessments and Method Statements (RAMS) will be reviewed in advance of any work being carried out. Clarification or amendment of methodology will be undertaken where risks are deemed unacceptable to reduce these to As Low As Reasonably Practicable (ALARP).

As contractor engagement progresses detailed RAMS can be submitted to Marine Scotland where required.