

Title:	Outline Operational Information – WTP – Indurent Park	Contract No:	N/A
Site/Project:	Indurent Park, Llanwern	Tech Note No:	1
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Issued To:	Rodgers Leask	By/Date:	PL / 17/12/24
Approved By:	Sam Hall	Review/Date:	SH / 18/12/24

1. Introduction

Rodgers Leask (RL) have engaged John F Hunt Regeneration (JFHR) to develop a water treatment scheme to manage the following:

- run-off water generated from the next construction phase at Indurent Park, and
- water associated with the adjacent Reen network.

Refer to RL drawing(s) 17480-RLL-24-XX-DR-O-1288.

The Reen network receives surface run-off from the site, along with off-site sources associated with neighbouring properties. The Reen(s) are also used for flood alleviation of the surrounding area and are over-pumped (when required) to Monks Ditch via an existing pumping station.

Monitoring of the Reens over the previous 12-months has identified some exceedances of discharge consent limits for ammonium and Biological Oxygen Demand (BOD).

2. Construction Effluent

Surface run-off from the next construction phase is assumed to contain significant suspended solids and will be managed using a multi-stage settlement lagoon; flocculant and coagulant may be added to enhance settlement of dissolved metals/metalloids and colloidal solids. Aeration and pH amendment has been proposed to enhance dissolved oxygen concentrations and promote the precipitation of metals, as well as the removal of ammoniacal nitrogen.

The facility to divert construction water for additional treatment via the Reen treatment system is also proposed should significant concentrations be encountered and the primary treatment options deemed insufficient.

3. Reen Water Treatment

Refer to drawing 17480-RLL-24-XX-DR-O-1289.

To contend with the specific exceedances of ammonium JFHR have proposed Ion Exchange (IX) filtration. It is also considered that the deployment of a Reverse Osmosis (RO) system may also provide an effective solution. An IX system requires less pre-treatment than an RO system. However, the process would require pH amendment before filtration to ensure that the ammoniacal nitrogen was in the ammonium ion form (NH_4^+ , acidic conditions), and likely subsequent pH amendment prior to discharge (neutral conditions). There is an obvious reliance therefore on supplies of chemicals and additional complexity. The key benefits of an RO system are minimising of pH treatment and regenerative (saline solution) reagents. However, for an RO system to be effective and reduce fouling, the pre-treatment requirements are more

onerous. Detailed design following bench scale laboratory trials on representative samples of the Reen water will confirm the most appropriate technology, though either method will require an element of pre-treatment of suspended solids via a secondary lagoon or lamella separation, and the reduction of BOD and Chemical Oxygen Demand (COD).

The Reen treatment is assumed to be required on an intermittent basis rather than a full-time water treatment system, the anticipated flow rate is to be determined but for preliminary design purposes a flow rate of approximately 40 cubic metres per hour has used.

4. Combined Treatment

It is proposed that the two treatment systems are linked to allow additional treatment of construction water via the ammonium treatment plant - should this be required. This would provide the ability to recirculate treated water from the outflow for re-treatment to ensure the desired effluent quality is achieved.

Water quality will be monitored using a combination of real-time monitoring (influent), along with UKAS accredited laboratory analysis of water samples on the influent and effluent (see below).

5. Monitoring / Sampling

Real-time monitoring of water quality parameters by data-logging sensors has been proposed to enable the Reen water to be treated on an “as needed” basis with concentration set-points initiating diversion of water for treatment when an upper threshold is triggered. When the concentration in the Reen reaches the lower threshold, the treatment would pause until required, ensuring efficient use of resources.

The specific instrumentation is to be confirmed but would comprise an online colorimetric water analyser providing real-time data and continuous monitoring with a measurement range of 0.01-10.0 mg/L NH_4^+ .



Laboratory samples would be taken to confirm sensor data, initially at a higher frequency during the commissioning and optimisation stage. During periods of higher flows, sampling frequency may be increased to account for the additional loading of the treatment plant.

6. Commissioning and Operation

The Reen treatment system will be designed and installed by JFHR. Experienced JFHR personnel will oversee the commissioning phase; it is expected that this will be a full-time requirement for up to two to four weeks.

Currently, it is understood that RL will design the lagoon system for treatment of the construction water, although this may change. JFHR will ensure that both systems are integrated.

The treatment plant will be fitted with telemetry, which will provide real time operational data. The treatment plant will be fitted with safety features including an automatic cut-off / shutdown, with alarms sent directly to JFHR. On-call JFHR personnel would attend site to rectify any issues with the plant. It is expected that as a minimum, JFHR staff will attend site one day per week to ensure the system is functioning at its maximum efficiency.

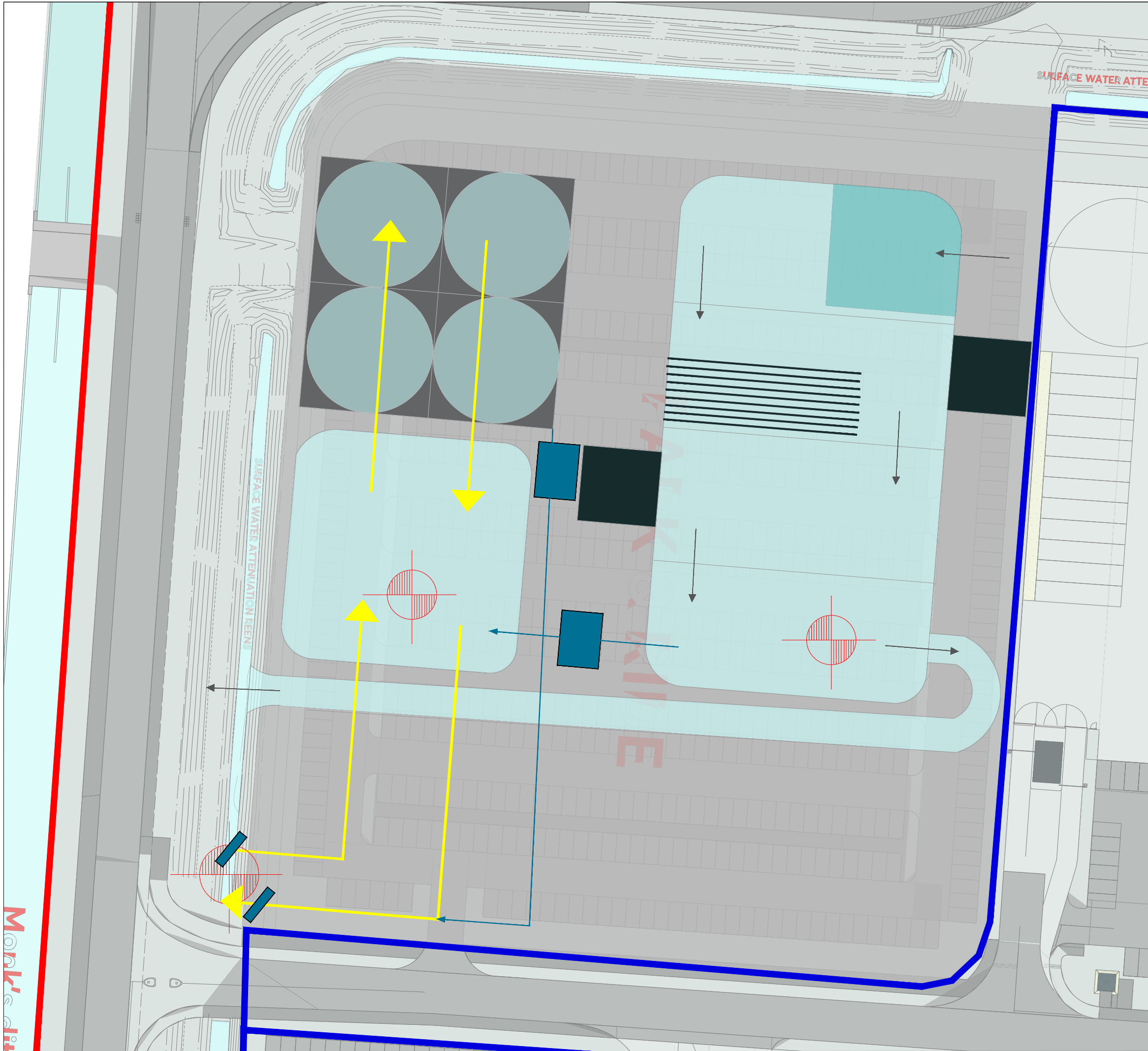
7. Summary

In summary, two treatment systems will manage the water arising from i) construction works at Indurent Park, and ii) the water in the adjacent Reen.

The Reen treatment system is proposed to receive the water from both systems (if required) and to ensure water quality is maintained at a standard better than the discharge consent limits. Data-logging sensors monitoring the influent, supported by laboratory sampling on the influent and effluent, has been suggested.

Detailed design work is required to determine the most appropriate solution for the Reen water treatment, comprising lab bench scale trials of resins and RO membranes. Additional specific lab analysis of raw water samples is anticipated.

At this stage a detailed design will be completed, along with the full operational manual.



GENERAL NOTES

NO DIMENSIONS TO BE SCALED OFF THIS DRAWING.

THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECT'S AND ENGINEER'S DRAWINGS.

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.

ALL LEVELS ARE IN METRES UNLESS NOTED OTHERWISE.

ANY DISCREPANCIES NOTED ON SITE ARE TO BE REPORTED TO THE ENGINEER IMMEDIATELY.

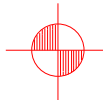
Key



SITE BOUNDARY



PHASE BOUNDARY



WATER QUALITY SAMPLE MONITORING POINT



PH ALTERATION



AERATION TUBES



SETTLEMENT LAGOON



RESIN FILTRATION (RF) OR REVERSE OSMOSIS (RO) UNIT (TBC)



BYPASS VALVE



REAL-TIME MONITORING

P02	17/12/2024	Updated to include bypass valves / routes and real time monitoring.	AMS	CW
P01	12/12/2024	First Issue	AMS	CW
Rev	Date	Amendments	By	Chk



Client

Indurent

Project

P17-480 Indurent Park,
Newport

Drawing Title

Provisional WTP Layout

INFORMATION

	Drawn	Checked	Date
NTS	AMS	CW	12/12/24
Drawing No.	Rev.		

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