

East Lancashire Paper Mill

784-B038963



Water Framework Directive Assessment



P04

Morris Homes

23/11/2023

**Document prepared on behalf of Tetra Tech Limited. Registered in England number:
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- Appendix E: Geo-environmental map

ACRONYMS/ABBREVIATIONS

Acronyms/Abbreviations	Definition
BG	Bealey's Goit
EA	Environment Agency
FRAP	Flood Risk Activity Permit
HG	Hutchinson's Goit
RBMP	River basin management plan
WFD	Water framework directive
WFDA	Water framework directive assessment

1.0 INTRODUCTION

1.1 BACKGROUND

- 1.1.1 The purpose of a Water Framework Directive Assessment (WFDA) is to ensure that compliance with the Water Framework Directive (WFD) is considered for any proposed development that has the potential to impact a water body. A WFD assessment will ensure that the proposed development will contribute to the achievement of the environmental objectives, or at a minimum, prevent any deterioration in status.
- 1.1.2 Tetra Tech Ltd. have been appointed by Morris Homes (the 'Client') to prepare a WFDA of the proposed development of East Lancashire Paper Mill, Radcliffe, Greater Manchester (the 'Site') (Figure 1-1). The WFDA will assess if this will impact upstream/ downstream waterbodies and the water body the site resides within.
- 1.1.3 The assessment supports the discharge of Planning Condition 21 and 22 for the Section 73 application reference 67597.
- 1.1.4 The Environment Agency has provided comments on version P02 of this report and additional feedback via consultation. These are included as Appendix A and have been addressed where relevant throughout the report. It has been updated to refer to the North West River Basin Management Plan Cycle 3, impacts have been reassessed based on the anticipated permitted flood risk activities to be confirmed at the Flood Risk Activity Permit Application (FRAP) stage and invasive species mitigation details have been included.
- 1.1.5 The proposed solution has been amended from P02 of this report. It is now proposed to retain the existing wall and the assessment has been updated to reflect this.

1.2 SCOPE OF THIS REPORT

- 1.2.1 To address the compliance of the site with the WFD, this assessment will:
- Outline the proposed development and present the current baseline data for the water body.
 - Consider impact of the proposed development on the environmental receptors within the water body.
 - Propose mitigation where detrimental impacts are identified.
 - Evaluate the proposed development against the mitigation measures and environmental objectives set out for the water body in the river basin management plan (RBMP).
 - Assess the compliance of the proposed development with the environmental objectives of the Water Framework Directive.

1.3 LIMITATIONS OF THIS REPORT

- 1.3.1 This report has been prepared by Tetra Tech Ltd. on behalf of the client in connection with the scope of the report as described in Section 1.2 above and taking into account the particular

instructions and requirements set out in Tetra Tech's fee proposal and the Client's acceptance. It is not intended for and should not be relied on by any third party and no responsibility is undertaken to any third party.

- 1.3.2 Tetra Tech Ltd. accepts no duty or responsibility (including in negligence) to any party other than the client and disclaims all liability of any nature whatsoever to any such party in respect of this report.
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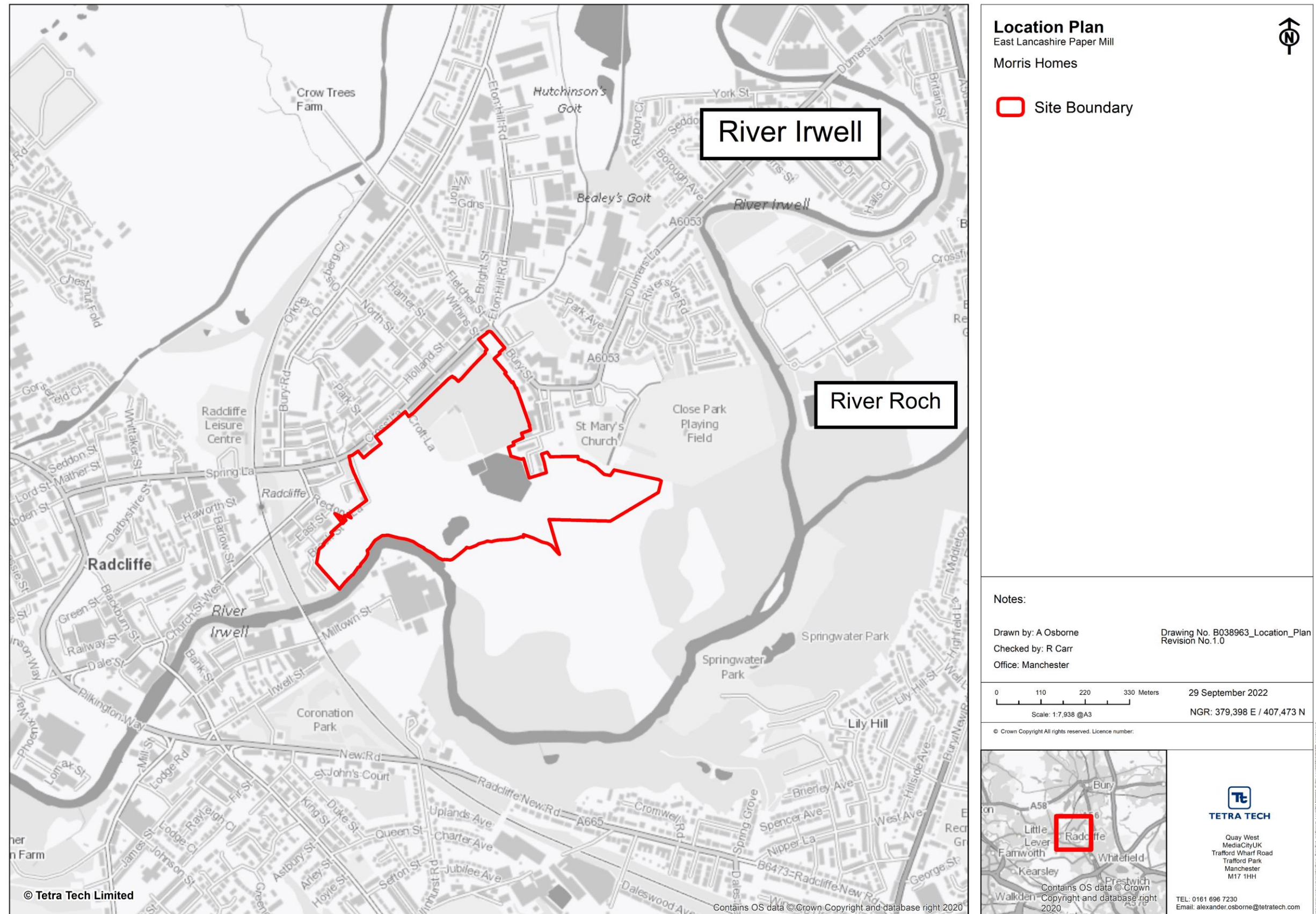


Figure 1-1: Site Boundary

2.0 EXECUTIVE SUMMARY

- 2.1.1 Morris Homes (the 'client') are undertaking the construction of a residential development at the East Lancashire Paper Mill, Radcliffe, Greater Manchester (the 'Site'). The creation of the residential development adjacent to the River Irwell is being assessed for compliance with the WFD.
- 2.1.2 The site of the proposed development is located within the water body identified as 'Irwell (Roch to Croal)'. The proposed development will reprofile river banks and will discharge surface water from the site into the River Irwell, through the intermediary reservoir (Lodge). It is proposed to retain the existing wall subject to structural investigations. The Hutchinson's Goit (HG) will be connected from its outflow at the culvert on the northeast of the site to the Lodge. Additionally, a section of bank wall within the Irwell adjacent to the site will be lower, to be reprofiled to more natural graded earth bank
- 2.1.3 It was determined that most receptors will experience negligible or no impacts from the proposed development. Where positive impacts have been identified these are at a localised scale and as such, the impact on the whole water body can be considered negligible. Where negative impacts are determined, these will be short term and through mitigation can be reduced to negligible.
- 2.1.4 Positive localised impacts were identified, namely the improvement of the riparian zone structure and condition in the River Irwell. The HG new channel will create a new riparian zone which will be of benefit over the current derelict site. The site's current use is derelict land and the change of use to residential will improve the drainage routes on site, through the use of SuDs.
- 2.1.5 The proposed embankment along the River Irwell is likely to enable the development of a more natural riparian zone which will benefit the flow regime of the river.
- 2.1.6 Following the impact assessment, compliance with the WFD for the proposed development was considered. The scheme is considered to be compliant as it will contribute to, or not prevent, the achievement of the WFD and RBMP objectives applicable to the site. This is summarised in Table 2-1.

Table 2-1: Compliance with WFD Objectives

Objective	Objective met? Y/N
The proposed development does not cause a deterioration in status for an environmental quality element.	Y
The proposed development will not negatively affect any elements of high status.	Y
The proposed development does not cause a significant localized impact on an element.	Y
The proposed development does not prevent the water body from achieving good surface water or groundwater status.	Y
The proposed development does not contribute to the pollution of surface waters or groundwater.	Y
The proposed development aids with (or does not prevent) the cessation of discharges, emissions and losses of priority hazardous substances into surface waters.	Y
The proposed development will not include changes that will permanently prevent the environmental objectives being met in other waterbodies.	Y
There are no residual risks following the implementation of the mitigation measures.	Y

3.0 ASSESSMENT APPROACH

- 3.1.1 The Water Framework Directive requires that environmental objectives be set for all water bodies (surface and ground).
- 3.1.2 The environmental objectives are outlined in Article 4 of the EU *Directive 2000/60/EC (The Water Framework Directive)* and are enforced in UK law under Article 13 of UK *The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017*. These objectives are defined as:
- Prevention of deterioration of the status of all waterbodies.
 - Protection, enhancement and restoration of all waterbodies with the aim of achieving good surface water status.
 - Reversing any significant and sustained upward trends in pollutant concentrations in groundwater.
 - Cessation of discharges, emissions and losses of priority hazardous substances into surface waters.
 - Progressively reducing the pollution of groundwater and preventing or limiting the entry of pollutants.
- 3.1.3 The WFD aims for all waterbodies to achieve at least ‘good ecological status’ (or for heavily modified waterbodies, to achieve ‘potential for good status’) within a specific timeframe. The progress is monitored through the biological, chemical and hydromorphological quality elements listed in section 3.1.2. The status of the biological and hydromorphological elements are determined to be either ‘Poor’, ‘Moderate’, ‘Good’ or ‘High’ and the chemical status is classed as either ‘Good’ or ‘Fail’. The overall status of a water body is determined by the lowest element status.
- 3.1.4 River Basin Management Plans (RBMPs) produced by the Environment Agency (EA) lay out the measures to be followed for each water body within the river basin to achieve the environmental objectives and attain good status.
- 3.1.5 Any proposed development that has the potential to impact environmental quality elements (“receptors”) in the water body must be assessed to determine whether it will prevent or delay the achievement of the environmental objectives. If any detrimental impacts are identified mitigation options should be proposed.

3.2 ASSESSMENT STAGES

- 3.2.1 The assessment will be undertaken in 4 sections: Screening, Scoping, Impact Assessment and Compliance Assessment.

SCREENING

- 3.2.2 Existing data for the water body will be collated and presented, as well as the data for any relevant upstream or downstream bodies. The objectives for the water body will be identified, as well as the timelines for achieving these.
- 3.2.3 The proposed development will be discussed in detail, and activities involved in the construction, operation and decommissioning of the development will be screened at a high level for potential impact. Any activities involved in the proposed development that are identified as being negligible risk at this screening stage are deemed in compliance with the WFD and will not progress to the scoping or impact assessment stages of the report.
- 3.2.4 If previous WFD assessments have been completed for the project, the outcomes of these will be considered at this screening stage.

SCOPING

- 3.2.5 The environmental quality elements at risk from activities involved in the proposed development (both in operation and construction) will be identified and scoped into the impact assessment. The quality elements are categorised into 4 groups for this assessment: biological, hydromorphological, physico-chemical and chemical. The individual receptors within these categories are shown in Table 3-1 below.

Table 3-1: Environmental Quality Receptors

Biological
Fish
Phytoplankton
Benthic Macroinvertebrates
Macrophytes and phytobenthos
Invasive Non-Native Species (INNS)
Hydromorphological
Hydrological regime: - Quantity and dynamics of flow - Connection to groundwater
River continuity
Morphological conditions: - River depth and width variation - Structure and substrate of riverbed - Riparian zone structure and condition

Physico-chemical

General conditions

- pH
- Temperature
- Dissolved oxygen
- Phosphate
- Ammonia

Chemical

Priority substances and priority hazardous substances

Pollutants

3.2.6 The decision to scope out any receptors from the impact assessment will be clearly justified.

IMPACT ASSESSMENT

3.2.7 The impact assessment will identify the potential risks to the environmental quality elements defined within the scoping exercise. The effects of activities identified within screening will be considered. Following a review of Environmental Permitting Guidance is anticipated that the Flood Risk Activities associated with the work are:

- Installation of outfalls within engineered banks.
- Soft engineered bank protection works.
- Repairing and protecting the bank of a main river.

3.2.8 These are to be confirmed with the EA during the Flood Risk Activity application process and subject to final proposal and contractor methodology.

3.2.9 The impact on the quality element will be categorised as either 'negligible', 'positive impact', 'negative impact' or 'no change' at a water body scale. Additionally, significant localised impacts may also be identified. A significant localised impact is defined as an effect that is either long-lasting, causes severe harm or affects a wide area within the water body but not the entire water body.

3.2.10 Where the impact is determined to be negative then the likelihood of the impact occurring will be assessed and mitigation measures will be suggested. The degree to which the impact will be assessed is dependent on the level of uncertainty (based on the scale, risk, complexity, and sensitivity). The higher the uncertainty, the more assessment will be carried out to give a high level of confidence in the results.

3.2.11 Where an element is classed as at high status, to be compliant with the WFD it needs to demonstrate that the impact of the proposed development will be negligible impact.

COMPLIANCE ASSESSMENT

- 3.2.12 Following the impact assessment, the overall impact on the ability to achieve the water body objectives will be considered. The proposed development will be considered in compliance if all the compliance criteria in Table 3-2 are met to a high level of confidence:

Table 3-2: WFD Compliance Criteria

WFD Compliance Criteria	
A.	The proposed development does not cause a deterioration in status for an environmental quality element
B.	The proposed development will not negatively affect any elements of high status.
C.	The proposed development does not cause a significant localised impact on an element
D.	The proposed development does not prevent the water body from achieving good surface water or groundwater status.
E.	The proposed development does not contribute to the pollution of surface waters or groundwater.
F.	The proposed development aids with (or does not prevent) the cessation of discharges, emissions and losses of priority hazardous substances into surface waters.
G.	The proposed development will not include changes that will permanently prevent the environmental objectives being met in other waterbodies.
H.	The proposed development complies with the RBMP objectives.
I.	There are no residual risks following the implementation of the mitigation measures.

SUPPORTING INFORMATION AND DATA USED

- 3.2.13 The status classifications are obtained from the Environment Agency Catchment Data Explorer latest data from 2023. This is considered to be the current best estimate. This data will be used as the baseline in assessing the potential for status deterioration.
- 3.2.14 The latest RBMP were produced in 2022 for Cycle 3 and these plans will be used in the assessment of objectives. Cycle 3 RBMPs are aligned with the UK guidance: The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017, following the end of the transition period of UK's withdrawal from the EU in January 2021. This assessment has considered the objectives set in the UK guidance in addition to the WFD.

4.0 SCREENING

4.1 CATCHMENT MANAGEMENT

- 4.1.1 The site of the proposed development lies within the North West River basin in the Irwell catchment (Figure 4-1).

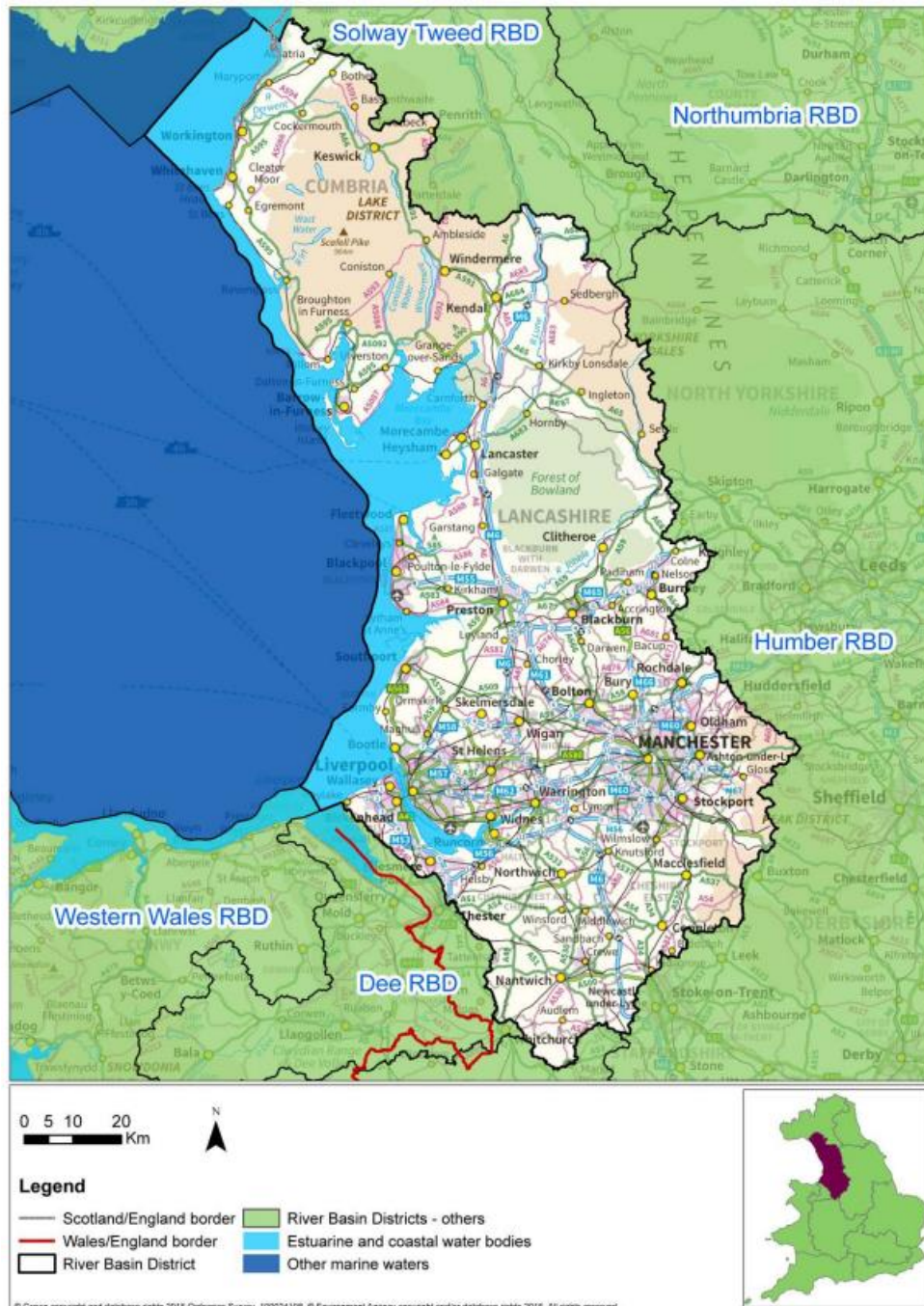


Figure 4-1: North West River Basin District

- 4.1.2 This catchment is managed by the North West RBMP, which sets out measures at a river basin level and local level to achieve good status for the water bodies within the catchment.
- 4.1.3 The North West RBMP produced for Cycle 3 (2022-2027) sets out a programme of measures for the river basin for improvement . This assessment will consider the programme of measures¹ and assess the proposed development to ensure it will not restrict the implementation of these.
- 4.1.4 The following are measures proposed for all catchments and are linked to the 2027 outcomes:
- **Habitat restoration or creation and species recovery.** E.g. river and lake restoration, removing barriers to fish movement, tackle Invasive Non Native Species, achieve objectives for water-dependent Sites of Special Scientific Interest and European sites, actions to conserve and enhance priority habitats and species
 - **Catchment schemes** e.g. Farm nutrient management plans and soil testing - improved farming practice
 - **Sustainable abstraction improvements** through changes to abstraction licences, licence conditions and non licence changes at specific sites
 - **Greater access to water and sustainable abstraction improvements** through: changes to abstraction licences including compulsory and voluntary licence changes, time limited licences renewal, apply powers for serious damage, revocation of unused licences, reducing quantities on under used licences and non licence changes
 - Working collaboratively with all stakeholders to **deliver integrated catchment solutions** to mitigate the impact of climate change and unsustainable abstraction. Update Abstraction Licence Strategy with findings from priority catchments by 31 July 2021
 - **Diffuse pollution control** initiatives, recovery of priority species - habitat restoration or creation and reintroducing species
 - **Sewage treatment improvements** by changes to licence conditions at specific sites
 - **Restoring sustainable abstraction improvements** through changes to licence conditions at specific sites
 - Various environmental improvements - **initiatives controlling pollution, restoring habitat**
 - Various **environmental improvements by farmers and land managers** including on farm improvements to wider collaborative nature based solutions including natural flood management
- 4.1.5 The following programmes are proposed for the Irwell Management Catchment and as such this assessment will seek to determine the scheme's impact on the ability of these programmes to be realised:
- Catchment wide prioritised programme of projects improving water quality, river and floodplain habitats, biodiversity and amenity value, and where possible reducing flood risk
 - A catchment wide rolling programme of barrier removal/fish easement/fish pass feasibility, design and construction.

¹ [River basin management plans, updated 2022: summary programmes of measures - 7. River basin district summaries - Guidance - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/publications/river-basin-management-plans-updated-2022-summary-programmes-of-measures-7-river-basin-district-summaries-guidance)

4.2 WATER BODIES

- 4.2.1 The site is situated within the Irwell (Roch to Croal) water body, with the river flowing into Irwell (Croal to Irk) as defined by Environment Agency's Catchment Data Explorer (Figure 4-2). The site is located within the midstream reaches of the water body and is adjacent to the River Irwell. Upstream waterbodies are the Irwell (Rossendale STW to Roch) and the Roch (Spodden to Irwell), with the downstream water body as the Irwell (Croal to Irk).

UPSTREAM WATER BODIES

- 4.2.2 There are two waterbodies upstream of the Irwell (Roch to Croal) water body. These are Roch (Spodden to Irwell) and Irwell (Rossendale STW to Roch) as shown in Table 4-1 and Table 4-2 below. The confluence of the Irwell and Roch is approximately 1.5 km from the site.

Table 4-1: Roch (Spodden to Irwell) Attributes.

Water Body name	Roch (Spodden to Irwell)
Water Body ID	GB112069064600
Water Body Type	River
Hydromorphological designation	Heavily modified
Length	21.7 km
Catchment area	42.6 km ²

Table 4-2- Irwell (Rossendale STW to Croal) Attributes.

Water Body name	Irwell (Rossendale STW to Croal)
Water Body ID	GB112069064620
Water Body Type	River
Hydromorphological designation	Heavily modified
Length	32.8 km
Catchment area	42.9 km ²

- 4.2.3 It is unlikely that any changes to the site will impact upstream waterbodies. Therefore, the impact on upstream catchments is screened out.

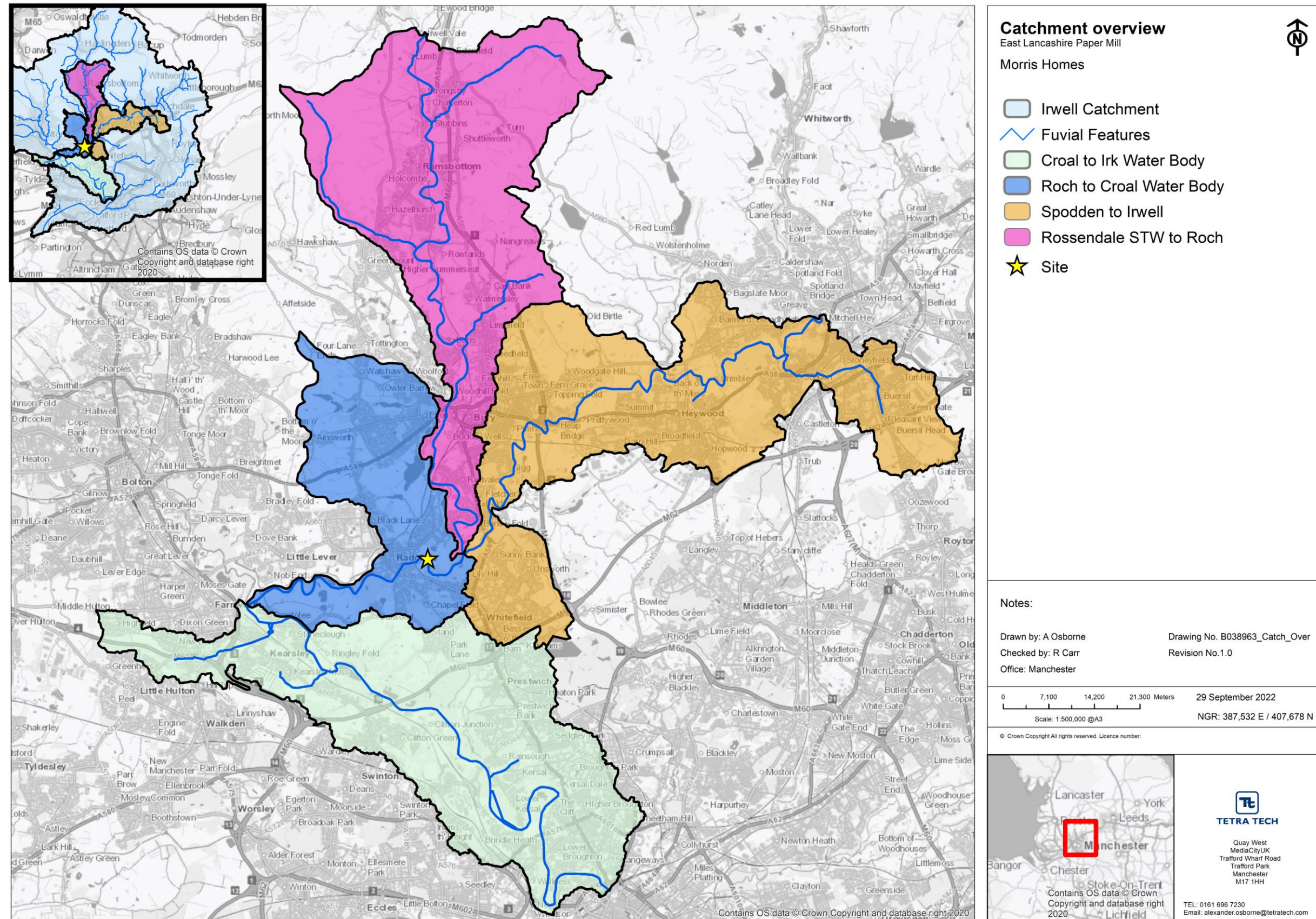


Figure 4-2: Water body catchments of the Irwell basin.

RESIDENT WATER BODY

4.2.4 The water body that the site will reside within is the Irwell (Roach to Croal) (Table 4-3).

Table 4-3: Irwell (Roch to Croal) Attributes.

Water Body name	Irwell (Roch to Croal)
Water Body ID	GB112069060840
Water Body Type	River
Hydromorphological designation	Heavily modified
Length	7.8 km
Catchment area	20.1 km ²

4.2.5 The most recent classifications for the Irwell (Roch to Croal) from 2022 are shown in Table 4-4.

Table 4-4: Irwell (Roch to Croal) classifications.

Quality element	Classification
Ecological	Moderate
• Biological	Bad
• Physico-chemical	Moderate
Hydromorphological	Supports Good
Surface Water	Moderate
Specific pollutants	High
Chemical	Fail
• Priority hazardous substances	Fail
• Priority substances	Fail

4.2.6 Currently the water body is classed as in 'Moderate Ecological condition' and is given 'Fail' status for the chemical condition. These are determined by the lowest status of elements in the category.

4.2.7 The elements at the lowest status are:

- Biological- Invertebrates (Poor)
- Chemical – Mercury and its compounds (Fail), PFOS (Fail), PBDE (Fail)

4.2.8 Elements that are currently classified as being at 'High' status are:

- Dissolved oxygen
- Temperature
- pH
- Specific pollutant levels

- 4.2.9 The Cycle 3 overall objective for the site is to achieve 'moderate' status by 2027. The site does not have 'good' status as the objective as to achieve good status is determined to be disproportionately expensive, involve disproportionate burdens and is technically infeasible as no known technical solution is available.

SITE INVESTIGATION

- 4.2.10 The site was walked over on the 30th August 2022 with an evaluation of the current River Irwell being undertaken, supported by photographs shown below. In general, the River Irwell is heavily modified in the reach, with banks being surrounded by walls and large earth embankments.

Site images



- Reinforced whole bank
- Vegetation degrading wall



- Left bank is partially contained with a brick wall
- Right bank is embanked with earth



- Right bank is in poor state of repair and failing.



- Bank and general site has a large amount of detritus.

DOWNSTREAM WATER BODY

4.2.11 The downstream catchment is the Irwell (Croal to Irk), beginning approximately 6.3 km downstream from the site (Table 4-5).

Table 4-5: Irwell (Croal to Irk) Attributes.

Water Body name	Irwell (Roch to Croal)
Water Body ID	GB112069061451
Water Body Type	River
Hydromorphological designation	Heavily modified
Length	25.2 km
Catchment area	41.9 km ²

4.2.12 Due to the distance downstream, no impact on the downstream water body is expected. Therefore, impacts on the Irwell (Croal to Irk) is screened out.

4.3 PROPOSED DEVELOPMENT

SITE PROPOSAL

- 4.3.1 A Reserved Matters application has been submitted for the development of up to 400 dwellings, public open space, sports facilities, and associated landscaping and infrastructure.
- 4.3.2 This scheme includes: recontouring the land within the site in order to provide additional area of functional floodplain while raising ground levels within the areas of proposed residential dwellings, reducing the height of the existing wall bounding the River Irwell, removal of trees and other vegetation, opening up the section of Hutchinson's Goit that is culverted through the site and create a 'blue' corridor and creation of surface water drainage features and greenspace.

- 4.3.3 It will involve the reprofiling of the right bank of the Irwell, maintaining the existing wall along its current reach, and creating a natural earth bank at a gradient of approximately 1:5 to the east.
- 4.3.4 The proposals have been developed following consultation with the Environment Agency. An optioneering exercise was undertaken which considered potential options in line with the green/grey hierarchy. Consultation with the EA took place on 26th September 2024 where retaining the existing wall was discussed as an alternative to a gabion wall solution. Therefore, it is proposed to retain the existing wall with a soft engineered graded embankment behind the wall which ties into the proposed development platform. Soft engineered embankments are also proposed upstream of the wall where a graded 1:5 embankment is proposed. Therefore, the proposals have aimed to maximise opportunities to incorporate green engineering.
- 4.3.5 Conceptual drawings of the proposed works are shown in Appendix B and the proposals are subject to detailed design.
- 4.3.6 The HG which currently has no defined outflow is to be diverted into the reservoir (Lodge) onsite and for an outflow via a spillway to the Irwell (Figure 4-4 below). It is calculated through modelling that a discharge of $0.75 \text{ m}^3 \text{ s}^{-1}$ can be expected from the spillway. The HG will undergo modification in the proposal so is also identified as at risk from this development.
- 4.3.7 Additional detail of the proposed works and method statement will be provided as part of the Flood Risk Activity Permit Application.

CONSTRUCTION PROCESS

- 4.3.8 Works will be carried out in phases (as defined by the contractor) thereby all construction effects will not occur simultaneously. Further details of the phasing will be provided within the method statement included as part of the Flood Risk Activity Permit.
- 4.3.9 The expected activities that may occur during construction, all of which will occur in the first phase, are detailed below:

River Irwell

Repairing and Protecting the Bank of a Main River

- 4.3.10 It is proposed to maintain the existing retaining wall onsite and therefore it is not anticipated that there will be any in-channel works at this location. Any required maintenance works are therefore proposed to be conducted from the landward side of the wall. These proposals are shown conceptually in Appendix B.
- 4.3.11 Rip-rap will be incorporated within the transition zones between the wall to be retained and the adjacent slopes to provide erosion protection however the length will be minimised as far as possible.

Soft Engineered Bank Protection Works

- 4.3.12 The ground behind the retained wall will be reprofiled with a maximum 1:3 gradient to tie into the proposed development platform. The wall will be lowered until it is flush with the existing ground levels at the interface between the graded embankment and retained section of wall.

- 4.3.13 Upstream of where it proposed to retain the wall, it is proposed to create a soft engineered graded 1:5 embankment from the development platform to the channel. The wall will be lowered in phases alongside the required excavation and grading to allow the works to take place from the landward face of the wall and no works are proposed in the channel.
- 4.3.14 Figure 4-3 below is an extract of the Urban Regen East Lancs Paper Mill Radcliffe Project Works summary (Sep 2024) provided by the client which demonstrates how the works might be undertaken from the landward side without the need for in-channel working.

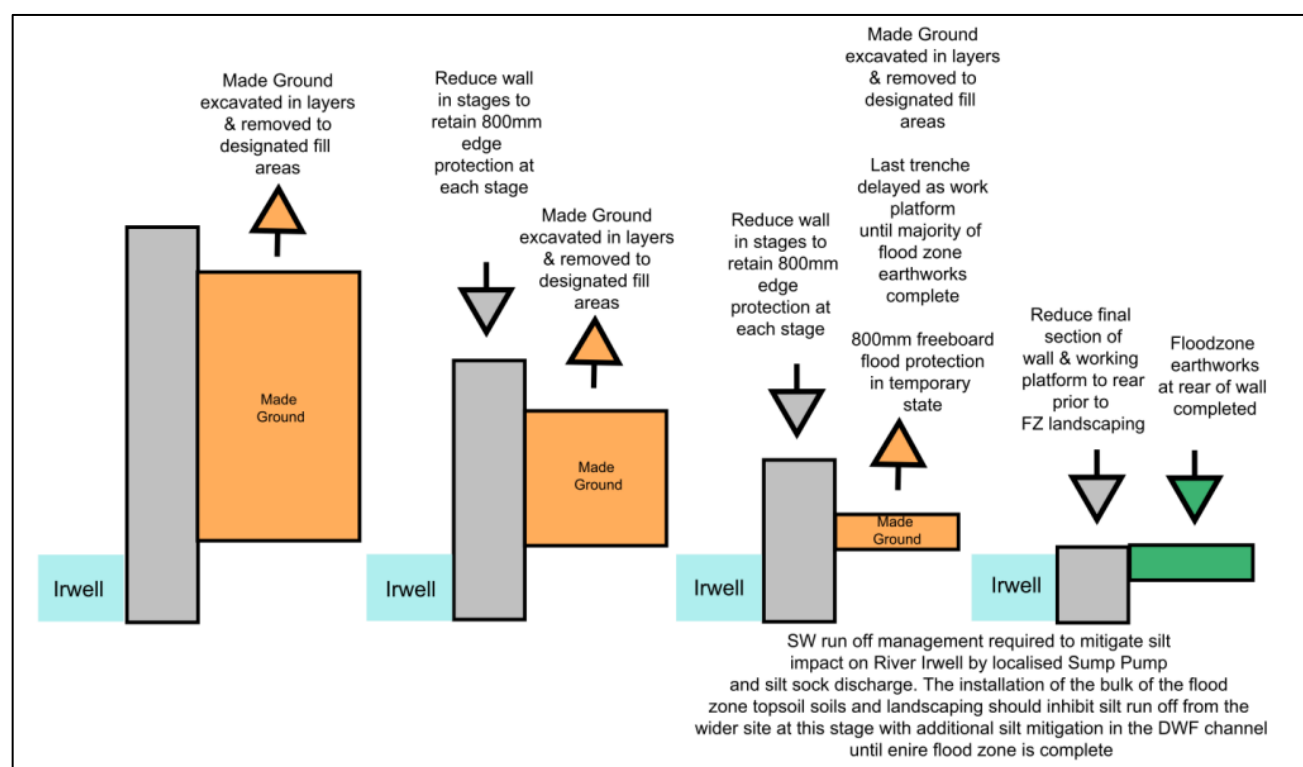


Figure 4-3: Wall Lowering and Ground Regrading

- 4.3.15 Therefore, it is not anticipated that a temporary dry working area will be required to complete the works nor is it proposed to have any plant within the channel. However, appropriate control measures will be put in place to mitigate the risk of silt dispersal or spread of invasive species. An invasive species survey and method statement is being submitted with the planning application and works will be carried out in accordance with the plan.
- 4.3.16 The embankment will be seeded and held in place with coir matting while the vegetation begins to take root. Coir rolls would be used to provide an element of stability at the toe prior to establishment of vegetation.
- 4.3.17 Rip-rap will be incorporated within the transition zones between the wall to be retained and the soft engineered embankment slopes to provide the necessary erosion protection however the length will be minimised as far as possible.
- 4.3.18 Appropriate mitigation for the rip-rap transitional solution is provided through lowering sections of the existing wall to provide a soft engineered embankment and the inclusion of vegetation.

- 4.3.19 These works are shown conceptually in Appendix B.
- 4.3.20 As noted in the Environment Agency response ENVPAC/1/GMC/00560 dated 01.11.2024 and included as Appendix A, the EA welcomes the evidence based optioneering that has been undertaken in support of the proposals.
- 4.3.21 The response notes that green options put forward for most of the bank length would be acceptable as would the use of riprap as a transitional material.
- 4.3.22 The response notes that the previous proposals for a gabion retaining solution is not acceptable and therefore the proposed solution should aim to utilise the existing wall and minimise the hard engineering. Therefore, in response the engagement with the EA the proposals have been amended to retain the existing wall with the only hard engineering proposed to be the rip-rap in the transition zones between the wall and the soft engineered embankment.
- 4.3.23 Appropriate mitigation for the rip-rap transitional solution is provided through lowering sections of the existing wall to provide a soft engineered embankment and the inclusion of vegetation.
- 4.3.24 The EA response also notes that revised plans to set back seating areas from the bank of the edge are welcomed following previous concerns and acknowledge the intention to submit a programme for INNS treatment.
- 4.3.25 The WFD has been updated to incorporate the EA comments to ensure the suitability of the proposals. The level of detail provided is considered commensurate with the detail required to discharge the conditions at this stage. Prior to the construction of the proposals an FRAP permit will be required. The detailed design will be developed in accordance with the strategy proposed within this WFD and this detailed design information will be provided at the FRAP stage alongside an updated WFD (where required) to ensure that the assessment captures the proposed activities.
- 4.3.26 Additional detail of the proposed works and method statement will be provided as part of the Flood Risk Activity Permit Application.
- 4.3.27 Installation of Outfalls within Engineered Banks.**
- 4.3.28 To accommodate the surface water drainage system required for the site it is anticipated that a new outfall will be required to discharge into the River Irwell. The exact location and structural detail is to be agreed at the detailed design stage.

Hutchinson's Goit

- Opening of culverted sections
 - Installation of outfalls for surface water strategy into culverted and opened sections of Hutchinsons Goit
 - Diversion of channel towards the Lodge reservoir
- 4.3.29 The contractor will produce a CEMP which will include a Pollution Prevention Plan and best practice guidance for working near watercourses. For example, the CEMP will include guidance for efficient water use, the use of silt barriers when reprofiling the ground and will detail the procedure to avoid spillages from construction plant. It will also stipulate that the cleaning of plant (in

particular those involved with concrete) will be undertaken offsite where the wastewater will be treated.

4.3.30 An Invasive Weeds Plan has been produced in August 2024 by The Environment Partnership which will be implemented during construction.

4.3.31 For construction being carried out from the bankside, all demolition materials will be removed from site on a regular basis meaning there is little interaction with the watercourse expected.

OPERATION

4.3.32 The proposed layout of the scheme is found in Appendix C, which includes the redirection of the HG from the site boundary towards the reservoir and then a spillway towards the River Irwell. There will be reprofiling of the banks around the Irwell to increase flood accommodation space on site. The development will include the inclusion of swales and retention pond structures throughout the site. Water will be kept onsite in SUD schemes with water being directed towards the HG and eventually the reservoir.

4.3.33 The reservoir before works was estimated to hold 17.21 ML of water, with the HG now proposed to drain into it along with additional surface water, a spillway will take water towards the River Irwell. The spillway will only be active during periods of wet weather.

4.3.34 It is anticipated that the surface water management plan will be in place throughout the operation of the development.

4.3.35 No changes to the how the development interacts with the watercourses following construction are anticipated during operation.

DECOMMISSIONING

4.3.36 Won't be decommissioned as lifetime is long so is screened out from the assessment.

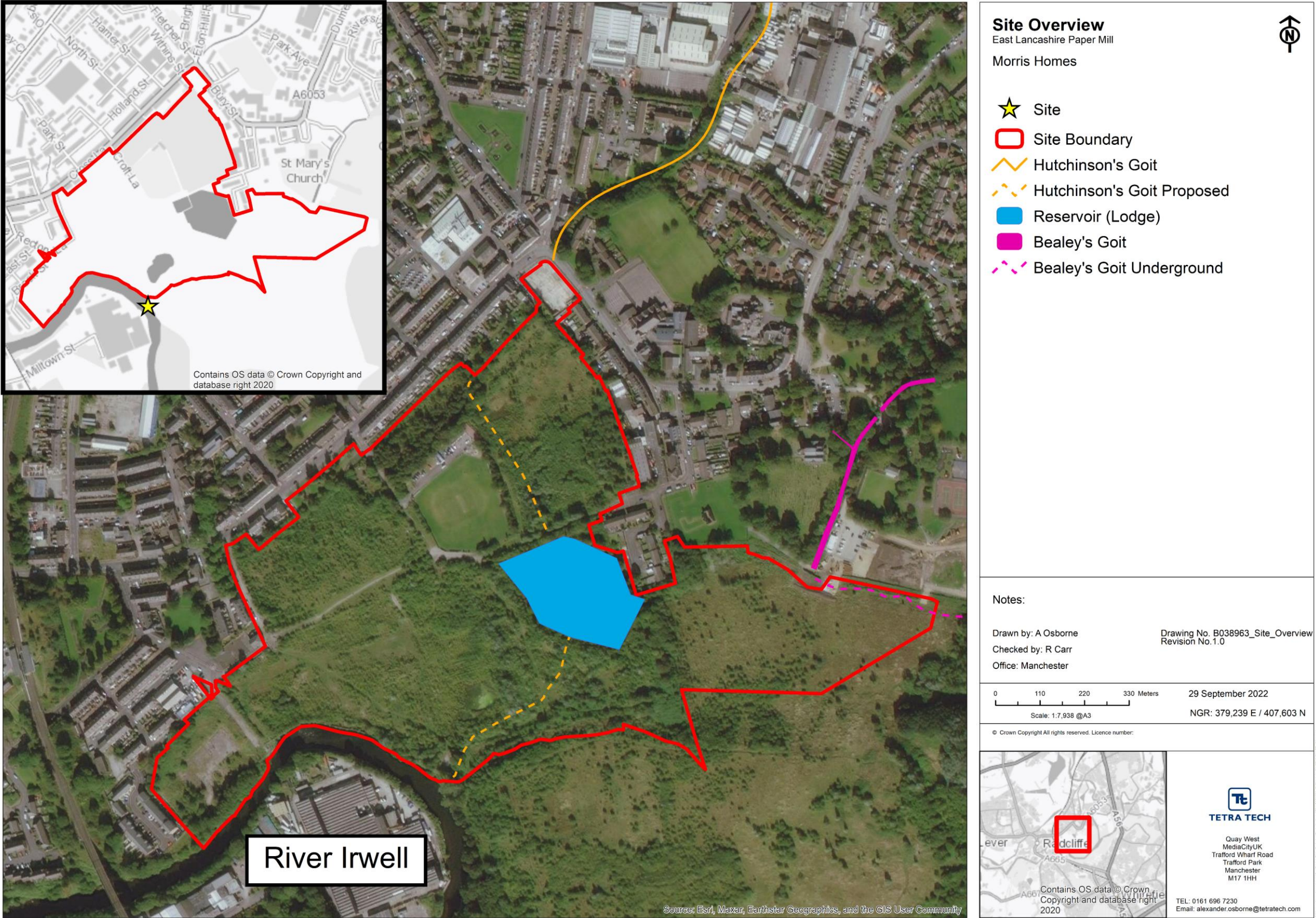


Figure 4-4: Site Plan.

4.4 SCREENING CONCLUSIONS

- 4.4.1 It is unlikely that any changes to the site will impact upstream waterbodies. Therefore, the impact on upstream catchments is screened out.
- 4.4.2 Due to the nature of the proposed development, which will be along the River Irwell and may have impacts on the watercourse as it flows downstream, the resident waterbody will be considered as part of this assessment.
- 4.4.3 Due to the distance downstream, no impact on the downstream water body is expected. Therefore, impacts on the Irwell (Croal to Irk) is screened out.
- 4.4.4 All construction activities listed in section 4.3 will be considered within the assessment.
- 4.4.5 Operational activities will be included in the assessment.
- 4.4.6 Due to the long lifetime of the scheme and the fact that it will be maintained and replaced in future, decommissioning will not be considered as part of the assessment.

5.0 SCOPING

- 5.1.1 The proposed development has the potential to alter the current status of the water body through impacts on the environmental receptors. The elements in Table 5-1 have been scoped in or out of the impact assessment. Justification has been given where an environmental receptor has been scoped out.

Table 5-1: Scoping of environmental receptors

Receptor	In/Out
Biological	
Fish	In
Phytoplankton	In
Benthic Macroinvertebrates	In
Macrophytes and phytobenthos	In
Invasive Non-Native Species (INNS)	In
Hydromorphological	
<i>Hydrological Regime</i>	
Quantity and dynamics of flow	In
Connection to groundwater	Out – Proposed activity will not reach the groundwater interface.
River continuity	In
<i>Morphological conditions</i>	
River depth and width variation	In
Structure and substrate of riverbed	In
Riparian zone structure and condition	In
Physico-chemical	
General conditions pH Temperature Dissolved oxygen Phosphate Ammonia	In
Chemical	
Priority substances and priority hazardous substances	In
Pollutants	In

6.0 IMPACT ASSESSMENT

6.1.1 Two areas of impact are assessed, the River Irwell and the HG given that the impacts will affect each of them differently. A Geomorphology report is written for impacts relating to flow and sediment transfer (Appendix D).

6.2 IMPACT ASSESSMENT- RIVER IRWELL

Key:

Negative impact	Negligible	Positive impact	No change
N/D. = not defined; N/A = not applicable			

CONSTRUCTION

Table 6-1: Impact Assessment on the River Irwell - Construction

WFD receptor	Current water body WFD classification	Description of impact to status from activity			Mitigation Required	Impact to status with mitigation
		Repairing and protecting the bank of a main river (Existing Wall)	Soft Engineered Bank Protection Works	Installation of Outfalls within Engineered Banks		
Ecological						
Fish	N/D	Works will be from bankside. No impact expected.	During construction on the banks, sediment may enter the river. Water quality may become affected thereby impacting fish populations. Given the current sediment	Machinery may cause noise or vibration impacts on fish populations. However, works will be carried out in phases and no works	Measures within the CEMP, i.e. sediment traps, will further	Negligible

WFD receptor	Current water body WFD classification	Description of impact to status from activity			Mitigation Required	Impact to status with mitigation
		Repairing and protecting the bank of a main river (Existing Wall)	Soft Engineered Bank Protection Works	Installation of Outfalls within Engineered Banks		
			load of the Irwell waterbody the impact from this section of bank over the construction period is seen as negligible. Works will be carried out in phases and no works are anticipated in the channel This is considered to be a negligible impact.	are proposed to take place within the channel thereby reducing the impact to negligible.	mitigate any impacts.	Negligible
Phytoplankton	N/D	Works will be from bankside. No impact expected.	During construction on the banks, sediment may enter the river. Water quality may become affected and light levels impacted. Works will be carried out in phases and no works are anticipated in the channel. This is considered to be a negligible impact.	Works are not expected to impact phytoplankton populations.	Measures within the CEMP, i.e. sediment traps, will further mitigate any impacts.	
Benthic Macroinvertebrates	N/D	Works will be from bankside. No impact expected.	During construction on the banks, sediment may enter the river. Water quality may become affected, light	There is no proposed working in the channel. Therefore there is no	Measures within the CEMP, i.e. sediment	

WFD receptor	Current water body WFD classification	Description of impact to status from activity			Mitigation Required	Impact to status with mitigation
		Repairing and protecting the bank of a main river (Existing Wall)	Soft Engineered Bank Protection Works	Installation of Outfalls within Engineered Banks		
			levels impacted and large sediment loading can smother benthic communities. However, Given the current sediment load of the Irwell waterbody the impact from this section of bank over the construction period is seen as negligible. Works will be carried out in phases and no works are anticipated in the channel.	impact on waterbody expected.	traps, will further mitigate any impacts.	Negligible
Macrophytes and phytobenthos	Moderate	Works will be from bankside. No impact expected.	During construction on the banks, sediment may enter the river. Water quality may become affected and light levels impacted. However, Given the current sediment load of the Irwell waterbody the impact from this section of bank over the construction period is seen as negligible.	There is no proposed working in the channel. Therefore there is no impact on waterbody expected.	Measures within the CEMP, sediment traps, will further mitigate any impacts.	

WFD receptor	Current water body WFD classification	Description of impact to status from activity			Mitigation Required	Impact to status with mitigation
		Repairing and protecting the bank of a main river (Existing Wall)	Soft Engineered Bank Protection Works	Installation of Outfalls within Engineered Banks		
			Works will be carried out in phases and no works are anticipated in the channel.			
Invasive Non-Native Species (INNS)	N/D	Onsite INNS are identified. There is a risk of further spread through transfer from machinery or spreading through groundworks. Mitigation measures are in place resulting in a negligible impact on classification.	Onsite INNS are identified. There is a risk of further spread through transfer from machinery or spreading through waterborne seeds. Mitigation measures are in place resulting in a negligible impact on classification.	Onsite INNS are identified. There is a risk of further spread through transfer from machinery or spreading through groundworks or waterborne seeds. Mitigation measures are in place resulting in a negligible impact on classification.	A management plan has been created to remove INNS during construction. Measures will be specified with the CEMP to prevent the further spread of INNS from transfer on machinery.	Negligible
Hydromorphological						
Quantity and dynamics of flow	Supports Good	No expected change during construction.	No works are proposed in channel and therefore there is no anticipated change.	No works are proposed in channel and therefore there is no anticipated change.	Works will be undertaken from the landward side to maintain flows and	N/A

WFD receptor	Current water body WFD classification	Description of impact to status from activity			Mitigation Required	Impact to status with mitigation
		Repairing and protecting the bank of a main river (Existing Wall)	Soft Engineered Bank Protection Works	Installation of Outfalls within Engineered Banks		
					minimise impact.	
River continuity	Supports Good	Downstream flows will be maintained during construction.	Downstream flows will be maintained during construction.	Downstream flows will be maintained during construction.	None required	N/A
River depth and width variation	Supports Good	No expected changes to depth or width during construction.	No expected changes to depth or width during construction, changes to bank profile will not alter width.	No expected changes to depth or width during construction.	None required	N/A
Structure and substrate of riverbed	Supports Good	Works will be from bankside. No impact expected.	Reprofiling of the banks will allow unconsolidated sediment to potentially flow into the Irwell during the implementation stage. It is likely that this is overall negligible.	Works will not interface with the riverbed. No impact expected.	Measures within the CEMP, i.e. sediment traps, will further mitigate any impacts.	Negligible
Riparian zone structure and condition	Supports Good	Existing wall the be retained. No change expected.	The existing riparian zone will be modified by the works. Existing vegetation will be removed. This will result in a temporary negative localised impact; however, this will be short	Outfall will be added into existing wall the be retained. No change expected.	None required	Negligible

WFD receptor	Current water body WFD classification	Description of impact to status from activity			Mitigation Required	Impact to status with mitigation
		Repairing and protecting the bank of a main river (Existing Wall)	Soft Engineered Bank Protection Works	Installation of Outfalls within Engineered Banks		
			term and only affects a small reach of riverbank and will have a negligible impact on the waterbody classification.			
Physico-chemical conditions						
pH	High	No change expected to pH conditions.	No change expected to pH conditions.	No change expected to pH conditions.	None required	N/A
Temperature	High	No change expected to temperature.	No change expected to temperature.	No change expected to temperature.	None required	N/A
Dissolved oxygen (DO)	High	No change expected.	No change expected.	No change expected.	None required	N/A
Phosphate	Poor	No change expected.	No change expected.	No change expected.	None required	N/A
Ammonia	Moderate	No change expected.	No change expected.	No change expected.	None required	N/A
Biochemical Oxygen Demand (BOD)	n.d.	No change. No increase in waste organic matter expected to occur from development – maintain current oxygen levels.	No change. No increase in waste organic matter expected to occur from development – maintain current oxygen levels.	No change. No increase in waste organic matter expected to occur from development – maintain current oxygen levels.	None required	N/A
Acid Neutralising Capacity	High	No change. No change in acidic/base inputs into	No change. No change in acidic/base inputs into	No change. No change in acidic/base inputs into	None required	N/A

WFD receptor	Current water body WFD classification	Description of impact to status from activity			Mitigation Required	Impact to status with mitigation
		Repairing and protecting the bank of a main river (Existing Wall)	Soft Engineered Bank Protection Works	Installation of Outfalls within Engineered Banks		
		river from geology or organic sources.	river from geology or organic sources.	river from geology or organic sources.		
Chemical						
Priority substances and priority hazardous substances	Fail	No change expected as work is carried out bankside and excavated sediment will be removed and disposed of appropriately to prevent hazardous material entering the watercourse through runoff.	The site is an ex-industrial site which has been abandoned for several years. Within the site there is potential for significant levels of mobile substances within the made ground. Particularly in the southern section with in-ground asbestos, elevated levels of lead and free phase hydrocarbons. (See Appendix E). Land to the east was a previous landfill site. This will not be touched by the works.	Currently there is no formal drainage onsite, allowing water to drain over the entire area. During construction temporary drainage will be created to manage flows and dispose of surface water. Measures within the CEMP i.e. silt and sediment traps, will prevent contaminated soils entering the watercourse.	Measures within the CEMP i.e. silt and sediment traps and Environmental site monitoring	Negligible
Pollutants	N/D	Any pollution from construction machinery will be mitigated against in the CEMP therefore the risk	Works will disturb the surface which may contain pollutants. Any runoff would either go towards	Any pollution from construction machinery will be mitigated against in the CEMP therefore the risk of pollutants	The CEMP will specify good working practices to minimise the	Negligible

WFD receptor	Current water body WFD classification	Description of impact to status from activity			Mitigation Required	Impact to status with mitigation
		Repairing and protecting the bank of a main river (Existing Wall)	Soft Engineered Bank Protection Works	Installation of Outfalls within Engineered Banks		
		of pollutants entering the watercourse is negligible.	the reservoir or to the Irwell. Any pollution from construction machinery will be mitigated against in the CEMP.	entering the watercourse is negligible.	risk of spills. Methods to manage any accidental spills effectively will be stipulated within the CEMP.	

OPERATION

Table 6-2: Impact Assessment on the River Irwell - Operation

WFD receptor	Current water body WFD classification	Description of impact to status (Operation)	Mitigation Required	Impact to status with mitigation
Ecological				
Fish	N/D	During operation the Irwell may see increased inputs of sediment originating from the proposed HG outlet. The levels of sedimentation will be very low and any impact on fish populations will be negligible. It is likely that any operational increase in sediment load will be offset by the bank reprofiling within the Irwell resulting in a more natural hydrological regime and a reduction in overall surplus of fine sediment deposition, thereby providing a localised positive impact. This impact is over a small reach of the waterbody and the overall impact on the waterbody is negligible.	None required	Negligible
Phytoplankton	N/D	As above, the levels of sedimentation may change which may have an impact on phytoplankton population, however the levels will be very low and any impact negligible.	None required	Negligible
Benthic Macroinvertebrates	N/D	As above, the levels of sedimentation may change which may have an impact on phytoplankton population, however the levels will be very low and any impact negligible.	None required	Negligible
Macrophytes and phytobenthos	Moderate	As above, the levels of sedimentation may change which may have an impact on phytoplankton population, however the levels will be very low and any impact negligible.	None required	Negligible

WFD receptor	Current water body WFD classification	Description of impact to status (Operation)	Mitigation Required	Impact to status with mitigation
Invasive Non-Native Species (INNS)	N/D	It is anticipated that INNS will be removed during construction. The proposed scheme is not likely to result in any changes to INNS within the waterbody. No expected change during operation.		N/A
Hydromorphological				
Quantity and dynamics of flow	Supports Good	The spillway to the Irwell will have negligible impact since outflow is expected to be at $0.75 \text{ m}^3 \text{ s}^{-1}$ during flood conditions which in comparison to the Irwell is insignificant, with discharge in excess of $100 \text{ m}^3 \text{ s}^{-1}$. The waterbody will have negligible impact.	None Required	Negligible
River continuity	Supports Good	No expected change during operation.	None Required	N/A
River depth and width variation	Supports Good	The exiting wall is being retained, and whilst there is an area of floodplain being created, there are no changes to the river depth and width that would result in a change to the waterbody status.	None Required	N/A
Structure and substrate of riverbed	Supports Good	Negligible change locally to the HG outflow into the Irwell, with some sediment transfer occurring. Proportionally to the Irwell, the water body will not adversely be affected.	None Required	Negligible
Riparian zone structure and condition	Supports Good	Once works to the floodplain are complete it is expected that the riparian zone will be locally improved over current conditions. The planting of suitable vegetation will enhance the riparian zone and will become more stable as a result of the works. However, this impact is localised and the impact on the waterbody is negligible.	None Required	Negligible
Physico-chemical conditions				
pH	High	No change expected to pH conditions	None Required	N/A

WFD receptor	Current water body WFD classification	Description of impact to status (Operation)	Mitigation Required	Impact to status with mitigation
Temperature	High	No change expected to temperature.	None Required	N/A
Dissolved oxygen (DO)	High	No change expected.	None Required	N/A
Phosphate	Poor	The connection of the reservoir to the Irwell will have negligible impact. Water sampling of reservoir indicated 20.5 µg/l which is rated as good (APEM P00007490, 04/22). When diluted into the Irwell overtime it will have negligible impact locally. The water body will not be adversely impacted by potential changes in phosphate levels from the proposed connection Change of site to residential from brown field may introduce sources of pollution i.e. fertilisers. It is assumed that these will be used on a small scale and following manufacturers instructions. Therefore, the potential use of fertilisers will have a negligible impact on the water body.	None Required	Negligible
Ammonia	Moderate	The connection of the reservoir to the Irwell will have a negligible impact. Water sampling of reservoir indicated 0.03 mg/l which is rated as high compared to the water body at moderate (APEM P00007490, 04/22). Change of site to residential from brown field may introduce sources of pollution i.e. fertilisers. It is assumed that these will be used on a small scale and following manufacturers instructions. Therefore, the potential use of fertilisers will have a negligible impact on the water body.	None Required	Negligible
Biochemical Oxygen Demand (BOD)	N.D.	No change. No increase in waste organic matter expected to occur from development – maintain current oxygen levels.	None Required	N/A

WFD receptor	Current water body WFD classification	Description of impact to status (Operation)	Mitigation Required	Impact to status with mitigation
Acid Neutralising Capacity	High	No change. No change in acidic/base inputs into river from geology or organic sources.	None Required	N/A
Chemical				
Priority substances and priority hazardous substances	Fail	The connection of the HG to the Irwell through the site has the potential of being a point source of substances when in flood. With the reservoir an integral part of the flood strategy, concentrations may build up, which then get deposited into the Irwell. The reservoir currently tests 'good' for pollutants, with no samples above exceeding permitted levels. Testing of the reservoir should be undertaken once works are complete to detect any rises to baseline conditions. Testing in 2017 indicated that the reservoir was similar to groundwater levels on site. No change is expected once works are completed and the site is allowed to stabilise.	None Required	N/A
Pollutants	N/D	The proposed HG channel will input runoff from site directly into the River Irwell. Current drainage off site is unregulated. With drainage and SuDS, pollution from site runoff will be treated with an appropriate treatment train and the design will limit contact with the made ground. With a drainage point of the spillway, water quality can be monitored and therefore a localised positive impact can be expected. Proportionally to the Irwell waterbody the impact is negligible.	Surface water drainage network will provide an appropriate level of treatment	Negligible

6.3 IMPACT ASSESSMENT- HUTCHINSON'S GOIT

CONSTRUCTION

Table 6-3: Impact assessment on the Hutchinson's Goit (construction)

WFD receptor	Current water body WFD classification	Description of impact to status (Construction)			Mitigation required	Impact to Status with mitigation
		Opening of culverted sections	Diversion of channel towards the Lodge reservoir	Installation of surface water outfalls		
Ecological						
Fish	N/D	Flow may be reduced or stopped to allow works to commence. The HG is already very slow and congested with vegetation. Negligible impact would be experienced as the impact would be short term.		No impact on fish populations expected.	None required	Negligible
Phytoplankton	N/D	Flow may be reduced or stopped to allow works to commence. Light and nutrient levels will remain the same. As the HG has minimal flow already, any changes would have a negligible impact.		No impact on phytoplankton populations expected	None required	Negligible
Benthic Macroinvertebrates	N/D	Flow may be reduced or stopped to allow works to commence. Light and nutrient levels will remain the same. As the HG has minimal flow already, any changes would have a negligible impact.		No impact on benthic macroinvertebrate populations expected	None required	Negligible

WFD receptor	Current water body WFD classification	Description of impact to status (Construction)			Mitigation required	Impact to Status with mitigation
		Opening of culverted sections	Diversion of channel towards the Lodge reservoir	Installation of surface water outfalls		
Macrophytes and phytobenthos	Moderate	Flow may be reduced or stopped to allow works to commence. Light and nutrient levels will remain the same. As the HG has minimal flow already, any changes would have a negligible impact.		No impact on macrophyte and phytobenthos populations expected	None required	Negligible
Invasive Non-Native Species (INNS)	N/D	Onsite INNS are identified. There is a risk of further spread through transfer from machinery or spreading through groundworks or waterborne seeds. Mitigation measures are in place resulting in a negligible impact on classification.			A management plan has been created to remove INNS during construction. Measures will be specified with the CEMP to prevent the further spread of INNS from transfer on machinery.	Negligible
Hydromorphological						
Quantity and dynamics of flow	Supports Good	During construction the HG might need to be dammed to allow for works to commence. The affect will be negligible as flow into the HG is through the Irwell, so therefore there will not be any build-up of water. Flow is already minimal given the build up of vegetation and the flow limiting in operation upstream.		No change expected.	None required	Negligible

WFD receptor	Current water body WFD classification	Description of impact to status (Construction)			Mitigation required	Impact to Status with mitigation
		Opening of culverted sections	Diversion of channel towards the Lodge reservoir	Installation of surface water outfalls		
		Any damming of water will not greatly affect the water body.				
River continuity	Supports Good	There will be negligible impact to continuity as if the HG is dammed for construction, the flow route upstream will still be open given that if is fed from the Irwell.		No change expected.	None required	Negligible
River depth and width variation	Supports Good	No change expected.			None required	N/A
Structure and substrate of riverbed	Supports Good	No change expected.			None required	N/A
Riparian zone structure and condition	Supports Good	Culvert will be opened, creating a riparian zone. This is a localised impact and the impact on a waterbody scale will be negligible.	No change expected.		None required	Negligible
Physicochemical						
pH	High	No change expected.				
Temperature	High	No change expected.			None required	N/A
Dissolved oxygen (DO)	High	No change expected.			None required	N/A

WFD receptor	Current water body WFD classification	Description of impact to status (Construction)			Mitigation required	Impact to Status with mitigation
		Opening of culverted sections	Diversion of channel towards the Lodge reservoir	Installation of surface water outfalls		
Phosphate	Poor	No change expected.			None required	N/A
Ammonia	Moderate	No change expected.			None required	N/A
Biochemical Oxygen Demand (BOD)	N.D.	No change. No increase in waste organic matter expected to occur from development – maintain current oxygen levels.			None required	N/A
Acid Neutralising Capacity	High	No change. No change in acidic/base inputs into river from geology or organic sources.			None required	N/A
Chemical						
Priority substances and priority hazardous substances	Fail	No change expected.	With the reservoir an integral part of the flood strategy, concentrations may build up, which then get deposited into the Irwell. The reservoir currently tests ‘good’ for pollutants, with no samples above exceeding permitted levels. Testing of the reservoir should be undertaken once works are complete to detect any	Currently there is no formal drainage onsite, allowing water to drain over the entire area. During construction temporary drainage will be created to manage flows and dispose of surface water. Measures within the CEMP i.e. silt and sediment traps, will prevent contaminated soils entering the watercourse. The resultant impact is negligible.	Measures within the CEMP i.e. silt and sediment traps and Environmental site monitoring	Negligible

WFD receptor	Current water body WFD classification	Description of impact to status (Construction)			Mitigation required	Impact to Status with mitigation
		Opening of culverted sections	Diversion of channel towards the Lodge reservoir	Installation of surface water outfalls		
			rises to baseline conditions. Testing in 2017 indicated that the reservoir was similar to groundwater levels on site. No change is expected once works are completed and the site is allowed to stabilise.			
Pollutants	N/D	Any pollution from construction machinery will be mitigated against in the CEMP therefore the risk of pollutants entering the watercourse is negligible.		No change expected.	The CEMP will specify good working practices to minimise the risk of spills. Methods to manage any accidental spills effectively will be stipulated within the CEMP.	Negligible

OPERATION

Table 6-4: Impact Assessment on Hutchinson's Goit - Operation

WFD receptor	Current water body WFD classification	Description of impact to status (Operation)	Mitigation required	Impact to Status with mitigation
Ecological				
Fish	N/D	The connection of the HG to the reservoir and then spillway will open a new flow path. Risk is minimal since the Irwell feeds into the HG and then will reconnect to the Irwell through the spillway. Current HG is degraded and unlikely to form a meaningful migration route. Destination of fish may be improved by connection to the reservoir, rather than a bottleneck. The naturalisation of the flow regime and bedload within the channel that is likely to occur in conjunction with the reprofiled river bank is likely to have a localised positive effect on the ability of fish populations to spawn and thrive. Overall impact will be negligible on a waterbody scale.	None required	Negligible
Phytoplankton	N/D	There will be localised improvement of flow through the HG to the reservoir. With new habitat being created with the proposed channel being daylight. The impact of the deculverting is likely to have a negligible impact at a waterbody, however on account of the HG there will be a localised positive impact.	None required	Negligible
Benthic Macroinvertebrates	N/D	There will be localised improvement of flow through the HG to the reservoir. With new habitat being created with the proposed channel being daylight. This is negligible at a waterbody scale.	None required	Negligible

WFD receptor	Current water body WFD classification	Description of impact to status (Operation)	Mitigation required	Impact to Status with mitigation
Macrophytes and phytobenthos	Moderate	There will be localised improvement of flow through the HG to the reservoir. With new habitat being created with the proposed channel being daylight. The impact of the deculverting upon the hydrology within the channel and the sediment transport is likely to be favourable for the development of macrophytes and phytobenthos locally but negligible at a waterbody scale.	None required	Negligible
Invasive Non-Native Species (INNS)	N/D	No change is to be expected, as the HG is fed by the River Irwell, and will flow eventually back to the Irwell. No new connection paths for INNS in the HG will be made.	None required	N/A
Hydromorphological				
Quantity and dynamics of flow	Supports Good	The HG during normal conditions is limited upstream by a retention structure, limiting flow to $0.5 \text{ m}^3 \text{ s}^{-1}$. At low flows the HG has limited flow due to sediment build up and vegetation. The diversion of flow into the reservoir will not cause any change to the flow dynamics.	None required	N/A
River continuity	Supports Good	There will be localised improved continuity as the HG is connected to the Irwell again through the spillway. Flow path is improved. Similarly the reprofiled Irwell river bank will improve consistency of flows within the Irwell. This impact is negligible at a waterbody scale.	None required	Negligible
River depth and width variation	Supports Good	The proposed HG channel will create a section of new river depth/width towards the reservoir. Compared to existing flow paths, a defined channel will have a localised positive impact. This impact is negligible at a waterbody scale	None required	Negligible

WFD receptor	Current water body WFD classification	Description of impact to status (Operation)	Mitigation required	Impact to Status with mitigation
Structure and substrate of riverbed	Supports Good	No change is expected during operation.	None required	N/A
Riparian zone structure and condition	Supports Good	A new riparian zone will be introduced by the creation of a channel from the HG culvert to the reservoir. This impact is negligible at a waterbody scale.	None required	Negligible
Physicochemical				
pH	High	No change expected to pH conditions	None required	N/A
Temperature	High	No change expected to temperature.	None required	N/A
Dissolved oxygen (DO)	High	No change expected.	None required	N/A
Phosphate	Poor	No change expected. No new inputs to the original HG.	None required	N/A
Ammonia	Moderate	No change expected. No new inputs to HG.	None required	N/A
Biochemical Oxygen Demand (BOD)	N.D.	No change. No increase in waste organic matter expected to occur from development – maintain current oxygen levels.	None required	N/A
Acid Neutralising Capacity	High	No change. No change in acidic/base inputs into river from geology or organic sources.	None required	N/A

WFD receptor	Current water body WFD classification	Description of impact to status (Operation)	Mitigation required	Impact to Status with mitigation
Chemical				
Priority substances and priority hazardous substances	Fail	No change expected during operation.	None required	N/A
Pollutants	N/D	Current drainage off site is unregulated. With drainage and SuDS, pollution from site runoff will be treated with an appropriate treatment train and the design will limit contact with the made ground before discharging into HG. Proportionally to the Irwell waterbody the impact is negligible.	Surface water drainage network will provide an appropriate level of treatment	Negligible

6.4 RESIDUAL RISKS

- 6.4.1 Taking into consideration the impacts identified above as well as any mitigation measures suggested, it can be concluded that there are no residual risks to the status of the water body.

6.5 ADDITIONAL BENEFITS

- 6.5.1 The proposed development has the potential to include some localised environmental enhancements to the area being developed. There is the opportunity to provide habitats and improve riparian vegetation at the site. The implementation of the Invasive Weeds Plan and the proposed replacement is improving the condition of the riparian and aquatic flora and will not prevent any works to the waterbody from meeting the following RBMP long-term objectives for this localised area:
- Improvement to condition of riparian zone and/or wetland habitats
 - Vegetation management
- 6.5.2 By utilising the site rather than being left as derelict land, there is additional benefit to the public and nature. Currently the site is a mixture of unused roads/ paths and fly tipping. The risk to the water body is from the continued declination of the site from current conditions, through the deterioration of existing networks and the risk of contaminated surface waters reaching the Irwell unchecked. With the implementation of a drainage strategy and being able to test surface waters, using sampling of the Lodge periodically to determine if there is a change in baseline condition caused by the connection of the HG. There would be a benefit to the WFD in terms of identifying any potential risks for mediation from the site that could have an impact at a waterbody scale.
- 6.5.3 The re-profiled banks within the Irwell allow for the colonisation of heterogenous vegetation, which is likely to develop and naturally diversify over time. In turn, the roots would consolidate the bank against excessive erosion.

7.0 COMPLIANCE ASSESSMENT

7.1.1 The conclusions of the impact assessment above have led to the WFD water body objectives in Table 7-1 being met.

Table 7-1: WFD criteria compliance

	Objective met? Y/N
The proposed development does not cause a deterioration in status for an environmental quality element	Y
The proposed development will not negatively affect any elements of high status.	Y
The proposed development does not cause a significant localised impact on an element	Y
The proposed development does not prevent the water body from achieving good surface water or groundwater status;	Y
The proposed development does not contribute to the pollution of surface waters or groundwater.	Y
The proposed development aids with (or does not prevent) the cessation of discharges, emissions and losses of priority hazardous substances into surface waters.	Y
The proposed development will not include changes that will permanently prevent the environmental objectives being met in other waterbodies.	Y
There are no residual risks following the implementation of the mitigation measures.	Y

7.1.2 The proposed scheme works towards, or does not prevent, the RBMP programme of measures listed in Section 4.1.

8.0 CONCLUSION

- 8.1.1 The purpose of this report is to address the compliance of the site with the WFD through:
- Considering the impact of the proposed development on the environmental receptors within the water body,
 - Proposing mitigation where detrimental impacts are identified,
 - Evaluating the proposed development against the mitigation measures and environmental objectives set out for the water body in the RBMP and,
 - Assessing the compliance of the proposed development with the environmental objectives of the Water Framework Directive.
- 8.1.2 The proposed new channel of the HG and reprofiled bank of the River Irwell at the East Lancashire Paper Mill, Radcliffe, have been assessed for compliance with the WFD.
- 8.1.3 No negative impacts have been identified during the operation phase and most environmental receptors will experience negligible impacts from the proposed development. Within the construction phase any temporary impacts will be mitigated with strategies to reduce the impact to negligible.
- 8.1.4 Where positive impacts have been identified these are at a localised scale and as such, the impact on the water body, can be considered negligible. The water body is not given the WFD objective to achieve 'good' status as this is determined to be disproportionately expensive, involve disproportionate burdens and is technically infeasible as no known technical solution is available. The proposed development would not be able to deliver any meaningful improvements to the River Irwell in terms of the WFD, as this would involve disproportionate costs and is technically infeasible as stated above. The proposed development does not prevent any future improvements to the River Irwell when considering the WFD objectives.
- 8.1.5 It has been determined that the proposed development is in compliance and will contribute to, or not prevent, the achievement of the WFD and RBMP objectives applicable to the site.
- 8.1.6 The WFD has been updated to incorporate the comments from recent EA consultation to ensure the suitability of the proposals. The level of detail provided is considered commensurate with the detail required to discharge the conditions relevant to the WFD at this stage in line with EA comments provided 14th February 2024 and included in Appendix A.
- 8.1.7 Condition 20** – As acknowledged by the Environment Agency in Appendix A, a programme for INNS treatment will be provided once completed by the contractor.
- 8.1.8 Condition 21** – The WFD has been revised to refer to North West River Basin Management Plan Cycle 3. A gabion basket solution is no longer proposed an evidence based optioneering exercise has been undertaken for the current proposals for retaining the existing wall, soft engineered embankments and rip-rap transition. INNS treatment programme will be provided by the contractor. The WFD assessment now breakdowns the different proposed activities.
- 8.1.9 Condition 22** - A gabion basket solution is no longer proposed and an evidence based optioneering exercise has been undertaken for the current proposals for retaining the existing

wall, soft engineered embankments and rip-rap transition. These proposals reflect EA comments and consultation which outlined the need to minimise hard engineering solutions. Rip-rap is proposed at the transition zone between the wall and the embankment however appropriate mitigation is provided through the lowering of the existing wall to provide the soft engineered embankments. The creation of surface water connections to the Irwell have also been addressed.

- 8.1.10 Condition 32** – An evidenced based optioneering approach which adopts the green-grey hierarchy has been undertaken which sets out the potential option and technical considerations. Following completion of this exercise and EA consultation it is proposed to retain the existing wall where required and lower upstream sections of the wall to create soft engineered embankments. Rip-rap is proposed at the transition zones with the soft engineered embankments and additional vegetation providing commensurate mitigation. Conceptual sketches are included in Appendix B.
- 8.1.11 Prior to the construction of the proposals an FRAP permit will be required. The detailed design will be developed in accordance with the strategy proposed within this WFD and this detailed design information will be provided at the FRAP stage alongside an updated WFD (where required) to ensure that the assessment captures the proposed activities.
- 8.1.12 Additional detail of the proposed works and method statement will be provided as part of the Flood Risk Activity Permit Application.

APPENDIX A: EA CONSULTATION

Tetra Tech
11 York Street
Manchester
M2 2AW

Project ref: ENVPAC/1/GMC/00560
Our ref: SO/2023/123793/04-L01
Your ref: Matthew Bell

Date: 01 November 2024

Dear Sir/Madam

**MEETING - 26 SEPTEMBER 2024 - REVISED DESIGN FOR DISCUSSION EAST
LANCS PAPER MILL, MANCHESTER, M26 9PG**

Thank you for accepting our offer to meet and provide detailed planning advice. We are providing this advice under Agreement No. **ENVPAC/1/GMC/00560**. Please note we have taken 5 hours to review and provide our advice. *[Please note that there are 5 hours remaining on this agreement]*.

Attendees

Sylvia Whittingham
John Bryan
Bonnie Boulton
Gary Morris
Matthew Bell
Liam Stewart
Chris Lord

Minutes from the Meeting

Following around the table introductions, Liam gave a full overview of the site, and the proposed conditions to be discharged.

We welcome the adoption of the evidence-based optioneering that has been undertaken in support of the revised design for bank protection along River Irwell. As discussed, the green options put forward for most of the bank length would be acceptable (aquatic vegetation, coir rolls and coir matting), as would the use of riprap as a transitional material (please note that the length should be minimised as far as possible). However, the proposal to use gabions at the upstream extent of the site is unacceptable due to lack of habitat value they provide and likelihood of failure in the short to medium term. Hard engineering needs to be kept to a bare minimum, and utilise the existing wall as much as possible to eliminate increasing the amount of engineering to this channel.

We are aware of other sites, which have adopted alternative solutions on similarly active sections of channel (Irwel: Radcliffe and Redvales Scheme, bank erosion adjacent to recently installed sheet piled flood walls - SD800086 and River Roch: Cadent Bank Protection to protect exposed gas pipe - SD 81197 08932). For any alternative hard engineered solution proposed at this location, please consider opportunities for embedding vegetation into the design, to both reduce erosion risk and provide some habitat benefit. It is important to note that for any section of hard reinforced bank, commensurate mitigation should be provided by providing enhancement of the wider riparian zone.

We previously raised concerns regarding the new pedestrian access seating area and footpath located very close to bank edge and welcome the revised plans which now show these areas to be set back, allowing greater space to adopt green engineering solutions.

We acknowledge the intention to submit a programme for INNS treatment once completed by the contractor later. It is recommended for riparian areas where schedule 9 INNS are present, that appropriate INNS treatment for the relevant species is commenced as soon as possible and ensure programme for INNS control is integrated with planned riparian engineering works and soft landscape reinstatement, minimising the risk of INNS being spread as part of these operations and reducing risk of INNS establishing or re-invading restored areas from neighbouring vicinity.

We agree that the WFD Assessment should wait until design details have been completed. Please ensure all activities which physically modify the channel are captured, alongside reference to mitigation as required. If further support is required with this assessment, please let us know.

Next Steps

Tetrattech to forward further details that will outline updated details in the form of a report.

If there is any further work, you anticipate needing our detailed advice on in relation to this project please let me know so it can be incorporated into this charging agreement. as hope the above advice is helpful.

Yours sincerely

Mrs. SYLVIA WHITTINGHAM
Planning Advisor

SPPlanning.RFH@environment-agency.gov.uk

Disclaimer

Our opinion is based on the information available to us at the time of the enquiry. When the formal planning application is submitted, our position may change if there have been changes to environmental risk or evidence, and/or planning policy.

Bury Metropolitan Borough Council
Town Hall
Knowsley Street
Bury
Lancashire
BL9 0SW

Our ref: SO/2024/123853/01-L01
Your ref: 70284
Date: 14 February 2024

Dear Sir/Madam

APPLICATION FOR RESERVED MATTERS APPROVAL (APPEARANCE, LANDSCAPING, LAYOUT AND SCALE) FOR THE ERECTION OF 400 DWELLINGS, RELOCATION OF CRICKET PITCH, INCLUDING A PAVILION, PRACTICE NETS AND SCOREBOX AND INCLUDING ALL DETAILS REQUIRED TO DISCHARGE THE FOLLOWING CONDITIONS FROM APPLICATION 67597; 9 (ACOUSTIC ATTENUATION); 11 (SURFACE WATER DRAINAGE PROPOSALS); 13 (WSI FOR ARCHAEOLOGY); 14 (BAT ROOST ASSESSMENT); 15 (BAT SURVEY FOR NEW CRICKET CLUB SITE); 16 (OTTER ASSESSMENT); 18 (BIRD SURVEY FOR NEW CRICKET CLUB SITE); 19 (RAMS FOR BADGER HABITAT); 20 (INVASIVE SPECIES REPORT); 21 (WATER FRAMEWORK DIRECTIVE ASSESSMENT); 22 (NO NEGATIVE IMPACTS ON RIVER IRWELL ECOLOGY); 23 (LANDSCAPE & HABITAT CREATION DETAILS); 24 (AFFORDABLE HOUSING SCHEME); 25 (RECREATION SCHEME); 27 (PHASING PLAN); 28 (INTERNAL ROAD PATTERN DETAILS); 29 (SCHEME OF LEVELS, DRAINAGE & MODELLING TO SUPPORT APPROVED FRA); 31 (FFL'S OF DWELLINGS); 32 (RIVER IRWELL BUFFER ZONE DETAILS); 37 (REPLACEMENT CRICKET CLUB FACILITIES); 39 (HIGHWAY DETAILS); 40 (SCOOT AT WATER STREET); 41 (PARKING STRATEGY); 44 (TRAVEL PLAN)

EAST LANCS PAPER MILL, CHURCH STREET EAST, RADCLIFFE, MANCHESTER, M26 9PG

Thank you for referring the above application for the discharge of conditions 20, 21, 22, 23, 29 and 32, to the Environment Agency. We Would wish to make the following comments.

Environment Agency
Richard Fairclough House Knutsford Road, Warrington, WA4 1HT.
Customer services line: 03708 506 506
www.gov.uk/environment-agency
Cont/d..

Environment Agency position

Geomorphology – (Condition 20, 21, 22 and Condition 32)

Condition 20

We do not recommend discharge of condition 20 (INNS management plan) based on current submitted management strategy (JK Solutions Ltd, 07/07/2022) does not provide a definitive treatment option(s) and plan showing what remediation option is to be adopted where and when, for the existing large East Lancs Paper Mill redevelopment site, and plan that is preferably coordinated with development phasing (Dwg No: PP-01 – Phasing Plan Rev A) and soft landscape reinstatement proposals indicated in landscape masterplan (M3477-SD-01-V08). This is particularly in reference to planned remodelling outlined in FRA (Tetra Tech, 24/11/2023) along River Irwell corridor, where extensive INNS population have been recorded.

Condition 21

We do not recommend discharge of condition 21 (WFD assessment) based on current assessment (Tetra Tech version P02, 23/11/2023) does not refer to most recent North West River Basin Management Plan Cycle 3 ([North West river basin district river basin management plan: updated 2022 - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/118888/North-West-River-Basin-Management-Plan-Cycle-3-Updated-2022.pdf)) or seemingly assess revised reserved riparian matters proposals indicated along the River Irwell waterbody i.e., Terramesh Wall system (SK23-5777-F1-01) & Flex MSE wall system SK01/RS/02 and temporary works required to construct this new hard revetment solution compared to originally proposed 1:3 earthen embankment. Current reserved matters application also now indicates that original proposals to deculvert part of Crow Trees Farm Brook have been abandoned and is again not reflected in updated WFD assessment. It is pertinent to note that there is a Cycle 2 mitigation measure for these works and must not prevent its delivery, specifically *IRC2: Deculverting of Crow Tree Farm Brook (SD7908407299): Deculvert section of Crow Tree Farm Brook up to confluence with River Irwell. Potential for ~100m opening of channel. High ecological benefit. High cost. High complexity. Potential for opening from SD7907007344 to SD7910207257.*

The assessment should also understand the risks of existing INNS identified on site (JKSL, 7/7/2022) and what “reasonable measures” will be put in place to stop the plant/s from spreading off as part of planned riparian works or how measures will be adopted to prevent your site being infested from identified neighbouring sources.

The current WFD assessment does not breakdown the activities associated with the scheme that will be impacting each WFD receptor, making it difficult to assess the cumulative impacts of the works. In addition, the assessment seemingly misunderstands the objectives of the WFD i.e. for example when assessing compliance with RBMP objective to address physical modification this is about the potential ability to restore more natural geomorphological processes along existing heavily modified waterbodies, where feasible - rather than about providing stable riverbanks.

All scheme activities which modify the channel and tributaries and could impact on WFD ecological elements should be listed and considered separately within the assessment.

Biodiversity

Condition 22. (Potential ecological impacts on the ecological status/potential of the river Irwell waterbody).

Although, we generally welcome the proposals to create large new areas of semi-natural greenspace and expanded floodplain connectivity along River Irwell corridor as indicated in landscape masterplan (M3477-SD-01-V08) and FRA (Tetra Tech, 24/11/2023), the opening up of Hutchinson's Goit, and the adoption of above ground SUDs solutions in the form of retention ponds, re-use of existing retained reservoir and integrated rain gardens and bio-swales all have potential to protect water quality in river.

However, the current demolition of existing river retaining wall and replacement with Terramesh Wall (SK23-5777-F1-01) or Flex MSE wall SK01/RS/02 and associated temporary works required to construct this new hard revetment solution along and part within the River Irwell waterbody and fishery, as well as create new surface water connection will potentially have some ecological and water quality issues that have not been fully addressed within current submissions to discharge condition 22. Therefore, we do not recommend discharge of condition 22.

Condition 23

The current landscape master plan (M3477-SD-01-V08) and associated submitted drawings SK23-5777-F1-01 - GABION TERRAMESH WALL PLAN, ELEVATION & SECTION, Dwg No: SK01/RS/01 – Site Elevation River Section, Dwg No: SK01/RS/02 – Site Elevation River Section A, does not provide a detailed landscaping schedule of new soft landscaping scheme within greenspace areas; preferably based largely on native species; including proposed new habitats (woodlands, wetlands and grasslands), retaining walls, and SUDs features. Therefore, we do not recommend discharge of condition 23 (Landscaping scheme).

Flood Risk

Condition 29

Regarding condition 29, we have reviewed the FRA (ref: 784-B038963/version 7) dated 24/11/2023. The discussion on the history of assessment of risk is noted and that the applicant has also used the Environment Agency's (EA) latest modelling from the Radcliffe and Redvales flood risk management scheme in addition to the earlier modelling undertaken in 2021. The proposals appear to follow the principles set out in the FRA that supported the outline planning permission with changes in ground levels to maintain flood plain volume.

Please can the following be clarified prior to the discharge of condition 29:

Referring to fig 5-3, the change in flood levels is noted especially the negligible changes upstream and downstream of the site. We also note the shading within the channel between the site and adjoining Pioneer Mill. This seems to suggest significant increases (>500mm) and reductions across the channel width not evident in the long section fig 5-4. Some explanation associated with these changes is requested. A table of flows and levels for the model nodes could help with this. We note the modelling report from June 2021 includes some discussion on levels based on earlier versions of the river model. An update to this commentary would be useful.

The June 2021 modelling includes 5%, 1% and 0.1% AEP event results. Have you repeated these with the latest modelling? Whilst the key event is the 1% AEP 35%CC as the “design flood” in the NPPF PPG, understanding any positive and negative changes in other events is advisable as undertaken before. The 1% and 0.1% AEP results will be essential for any future requests to change the flood zone outlines on the published flood map.

The applicant has also engaged in recent pre-application discussions on the flood risk with the EA. The applicant is aware of these comments and recommendations through the pre-app consultation with us. We will be pleased to comment further on receipt of additional information.

Condition 32 (River Irwell riparian buffer details).

The proposed bank modifications require further detail and justification for the measures proposed. Specifically, the gabion wall and maccaferri mattress solution and Flex MSE do not allow for natural processes to occur and provide little habitat benefit. The Agency recommend adopting a green-grey hierarchy, prioritizing measures which use natural materials and work natural processes (see HR Wallingford and RRC guidance below). Should hard bank protection be required, commensurate mitigation should be provided.

[Green approaches in river engineering.pdf \(hrwallingford.com\)
river advice, consultation, projects, the RRC - the River Restoration Centre](https://www.hrwallingford.com/river-advice-consultation-projects-the-rrc-the-river-restoration-centre)

Furthermore gabions have a poor longevity in Pennine rivers such as River Irwell and tend to have short life span when placed in such rivers. In addition, current proposals lack detail, for example there is no design detail for how the bank modification will transition from different grades, account for the proposed culvert headwall or tie into the natural bank (where it will be most susceptible to future erosion).

We also note as part of the reserved matters submission, limited cross-section details within and along the river Irwell corridor has been provided to clearly understand what scale of land remodelling works are sought along key ecological network and receptor. We would recommend that pre and post cross section detail be provided every 50m to clearly understand scale, levels of new and/or retained bank revetment details, details of new surface water connections, opportunities to enhance ecological network by removing redundant hard standing and tipped material, as well as bank reinstatement proposals including soft landscaping based on appropriate native species; where modified; along whole riparian corridor within ELPM development site.

Details should also demonstrate how the buffer zone will be protected during development construction and how managed and maintained over the long term.

The new pedestrian access seating area is located very close to bank edge and in a softer riparian revetment solution area, providing limited undisturbed ecological buffer and promoting pedestrian access in a less resilient area of restored corridor.

Therefore, based on the above we do not recommend discharge of condition 32.

Advice to the applicant

It is recommended all future drawings are legible (i.e., river section drawing which is pixelated, making inserted elevations illegible [SK01-SS-PL01 - Site Elevations Rev B-Layout1.psd \(bury.gov.uk\)](#) or locations of INNS within development footprint (JKSL, 07/07/2022).

The proposed development has the following Environmental Permitting Regulations Permitted sites in close proximity. These facilities should be noted as some permitted facilities have a potential to cause amenity issues or contribute to air emissions. They are:

Advice to the LPA

Site name	Permit number	Industry Sector	Postcode	Distance from proposed development	Direction from proposed development
Annotec Works	EPR/BN5386IN	Metals	M26 2RH	92 metres	NNW
Elton Hill Road	EPR/BX2914IK	Metals	M26 2ZT	494 metres	N
New Bridge Chemical Works	EPR/BM0044IW	Chemicals Manufacture	M26 2GL	906 metres	NE
Bryn Power	EPR/SP3302SL	Medium Combustion Plant	WN4 8BU	1.5 kilometres	SSE
Bury Wastewater Treatment Works	EPR/SP3631LL	Biowaste	BL9 9TF	1 kilometre	E

Please forward a copy of this letter to the applicant.

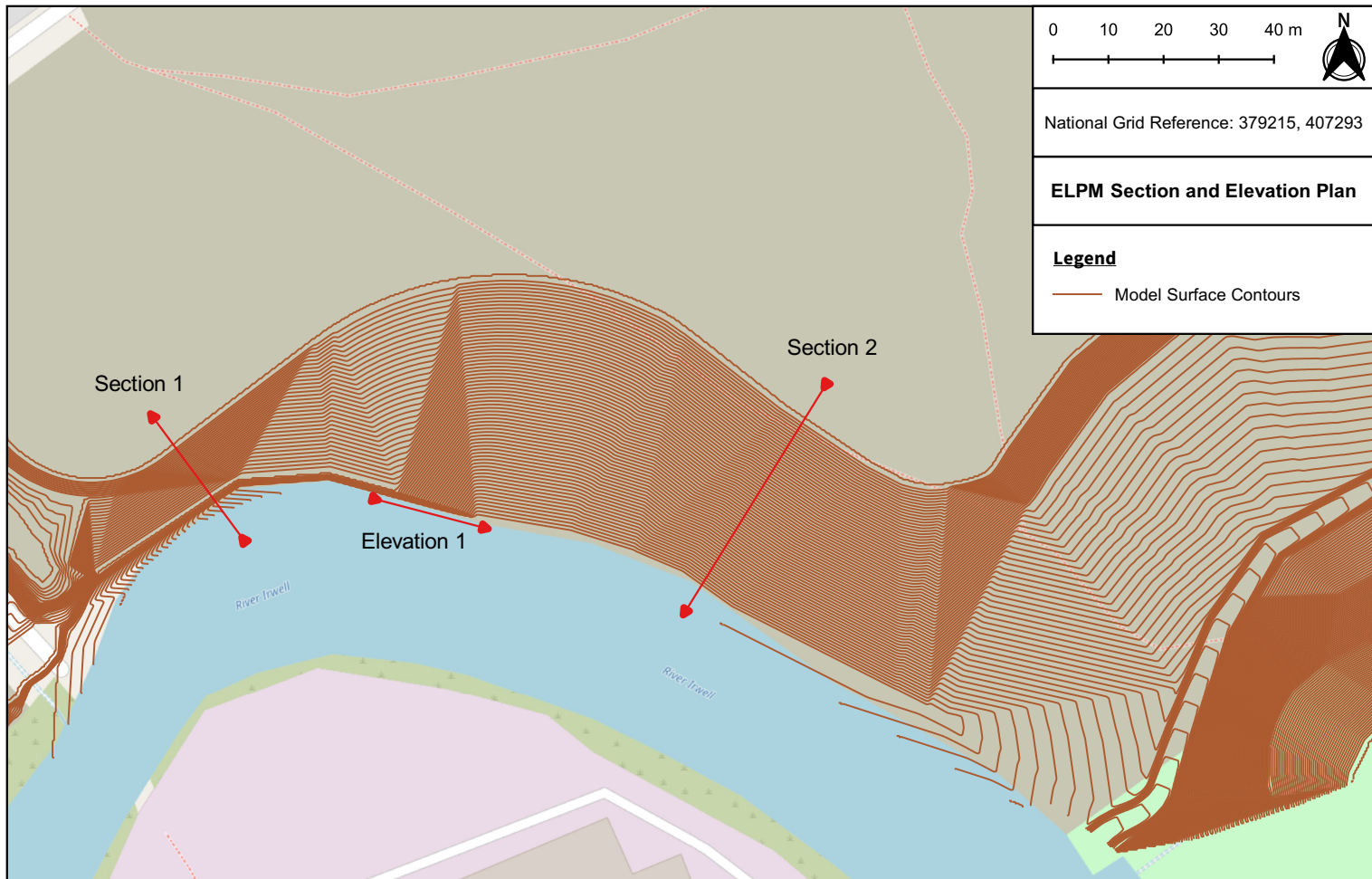
Yours faithfully

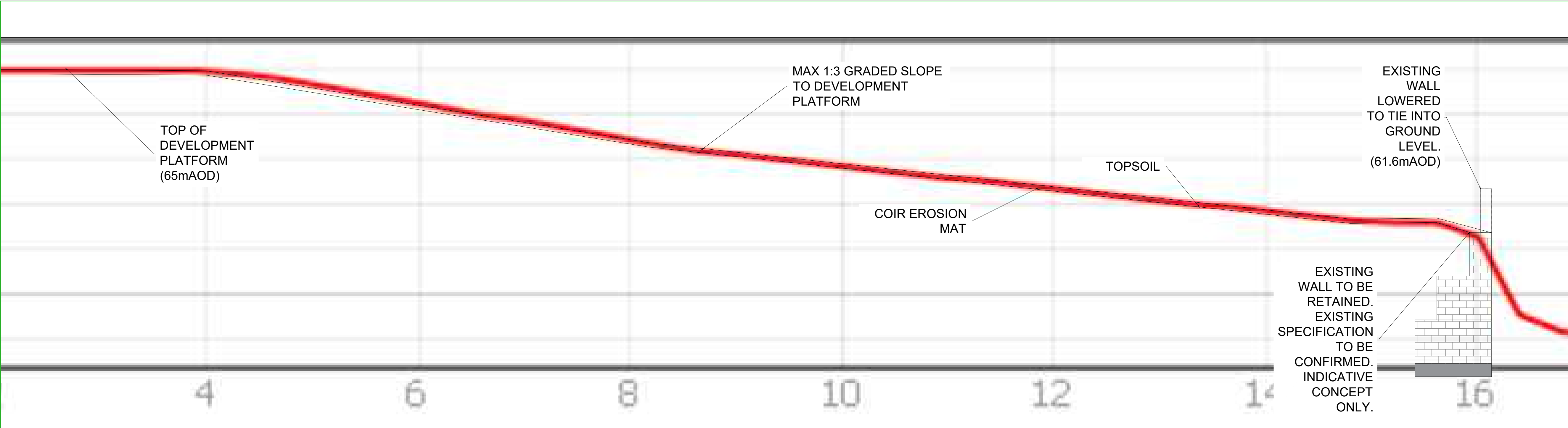
Mrs. SYLVIA WHITTINGHAM
Planning Advisor

Direct dial 0203 0251059

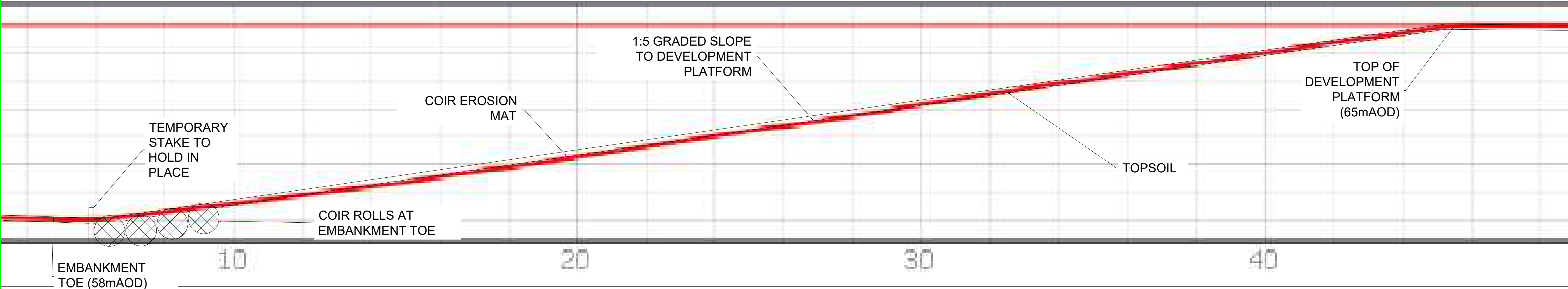
Direct e-mail sylvia.whittingham@environment-agency.gov.uk

APPENDIX B: CONCEPT DRAWINGS

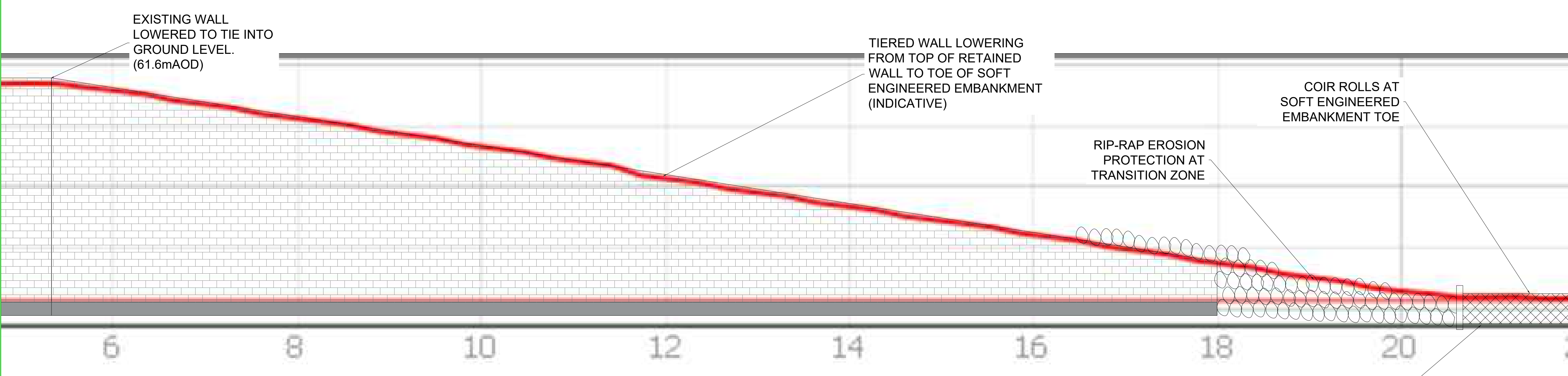




SECTION 1: RETAINED WALL WITH SOFT ENGINEERED REGRADED 1:3 EMBANKMENT



SECTION 2: SOFT ENGINEERED EMBANKMENT WITH 1:5 GRADING



ELEVATION 1: TRANSITION ZONE GRADING BETWEEN RETAINED WALL AND SOFT ENGINEERED EMBANKMENT

NOTES

- THIS DRAWING IS INDICATIVE AND CONCEPTUAL AND PROVIDED FOR ILLUSTRATIVE PURPOSES ONLY.
- THE SPECIFICATION OF THE EXISTING WALL IS SUBJECT TO CONFIRMATION THROUGH INVESTIGATION.
- INDICATIVE SOLUTION IS SUBJECT TO DETAILED DESIGN.
- ADDITIONAL DETAIL TO BE PROVIDED AT SUBMISSION OF FLOOD RISK ACTIVITY PERMIT APPLICATION.

KEY

EXISTING WALL

COIR ROLL

FOR INFORMATION ONLY

Rev	Description	Date	LS	MB	FH
P02	UPDATED TO INCLUDE TRANSITION ELEVATION	07/11/24	LS	FH	FH
P01	INDICATIVE CONCEPT	24/10/24	LS	MB	FH

Document Control

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www.tetrachteurope.com

Client

MORRIS HOMES

Project Name

EAST LANCS PAPERMILL

Sheet Title

INDICATIVE CONCEPT SKETCH

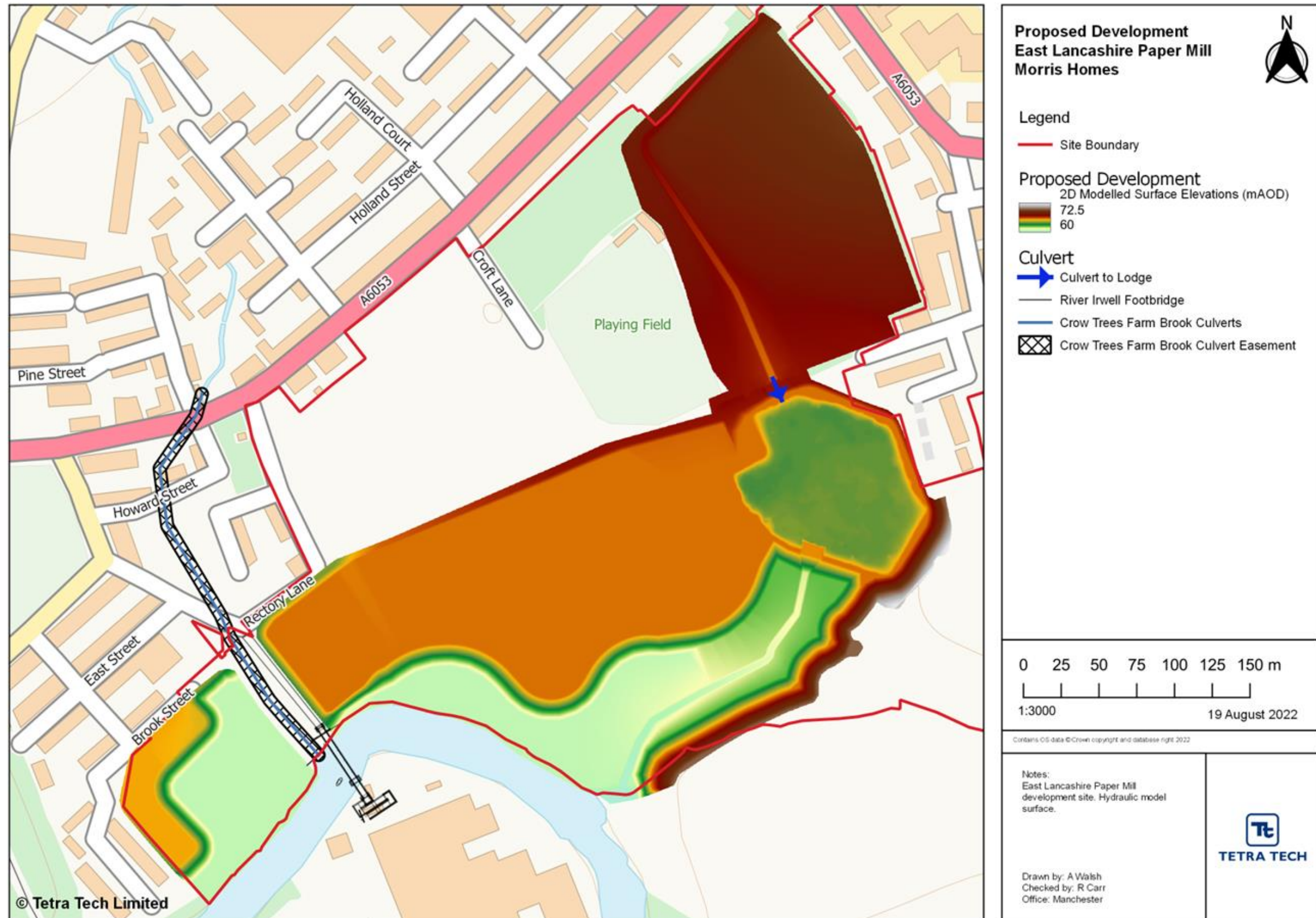
TTE Project Number	Drawn By	Date	Checked By	Date	Approved By	Date	Scale	Suitability
B038963	LS	SEP '24	MB	SEP '24	FH	OCT '24	AS SHOWN	S0

Client Project Number	Originator	Volume/System	Level/Location	Type/Code	Role	Number	Revision
B038963	- TTE	- 00	- ZZ	- DR	- S	- 0001	P02

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APPENDIX C: PROPOSED DEVELOPMENT



APPENDIX D: GEOMORPHOLOGY REPORT

East Lancashire Paper Mill

784-B038963



Geomorphology Assessment



Version 2

Morris Homes

23/11/2023

Document prepared on behalf of Tetra Tech Limited. Registered in England number: 01959704



Tetra Tech Manchester, Quay West at MediaCityUK, Trafford Wharf Road, Trafford Park, Manchester, United Kingdom, M17 1HH

Tetra Tech Limited. Registered in England number: 01959704
Registered Office: 3 Sovereign Square, Sovereign Street, Leeds, United Kingdom, LS1 4ER

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Revision:	P02	Prepared by:	M Craig
Date:		Checked by:	R Bramwell-Carr
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Description of Revision:	Revision to compensatory storage design		

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ACRONYMS/ABBREVIATIONS

Acronyms/Abbreviations	Definition
BG	Bealey's Goit
HG	Hutchinson's Goit

1.0 INTRODUCTION

1.1 BACKGROUND

- 1.1.1 Tetra Tech was commissioned to perform a geomorphological assessment on behalf of Morris Homes for their site located at the former East Lancashire Paper Mill, Radcliffe, Greater Manchester (Figure 1). The assessment supports the wider Water Framework Directive Assessment in the discharge of Planning Condition 21 for the Section 73 application reference 67597. There is a proposed introduction of a new channel connecting the Hutchinson's Goit (HG) to the River Irwell, through a reservoir (Lodge) and spillway, utilising an existing outflow point used previously by Bealey's Goit (BG).
- 1.1.2 It is also proposed to lower the wall along the outer bank of the River Irwell adjacent to the site to form compensatory flood storage and increase the Irwell's functional flood plain.
- 1.1.3 The creation of a new channel and wall lowering is to be assessed against the geomorphological impact to the existing fluvial network.

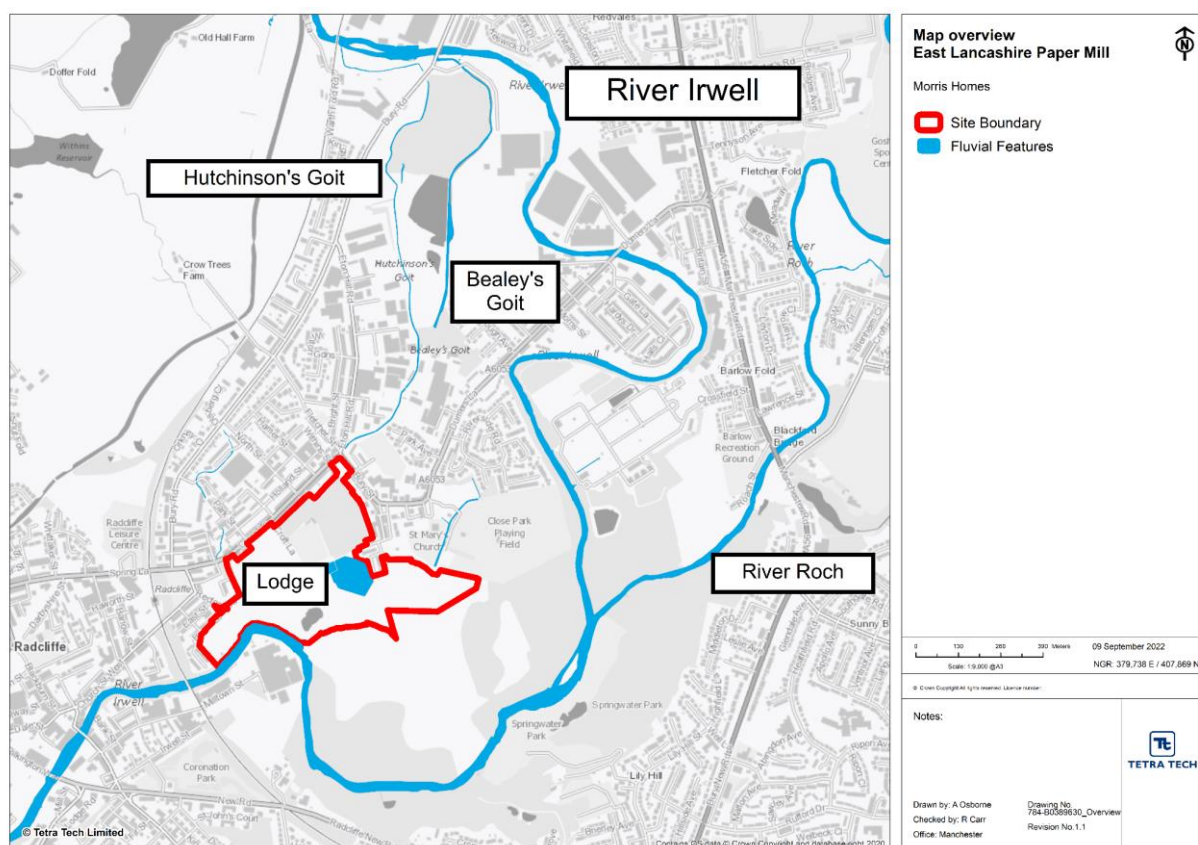


Figure 1- Map overview of site

1.2 SCOPE OF REPORT

- 1.2.1 The purpose of the report is to provide a baseline understanding of the geomorphological state of the Irwell, it's connection to the proposed HG outflow, the re-profiling of the existing river bank, and any impact to the River Irwell after being established.

1.2.2 The following objectives are set out:

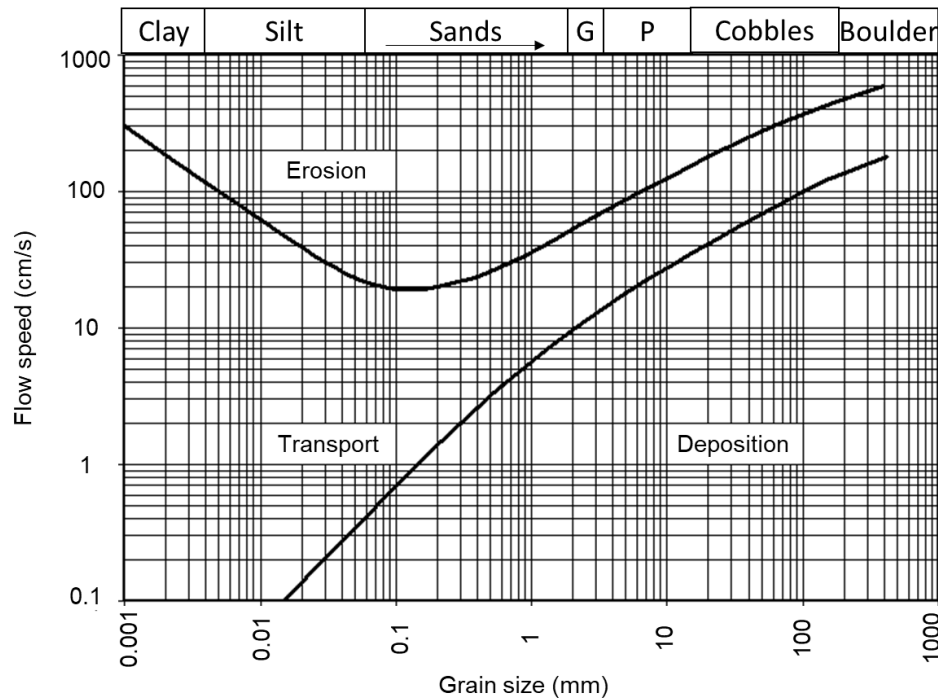
- To examine the River Irwell's geomorphological condition and current processes within the vicinity of the HG's new outflow, and along the length of the existing wall along the bank of the Irwell.
- To identify the impact of establishing a new HG channel planform and its connection to the River Irwell.
- To identify the impact of re-profiling the river bank adjacent to the site.

1.3 LIMITATIONS OF THIS REPORT

- 1.3.1 This report has been prepared by Tetra Tech Ltd. on behalf of the client in connection with the scope of the report as described in Section 1.1 above and taking into account the particular instructions and requirements set out in Tetra Tech's fee proposal and the Client's acceptance. It is not intended for and should not be relied on by any third party and no responsibility is undertaken to any third party.
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2.0 ASSESSMENT APPROACH

2.1.1 Fluvial geomorphology is concerned with the study of sediment sources, transport and deposition within a catchment and their effect on the floodplain, channel morphology over short to long time periods (Figure 2 and 3)



). Fluvial assessments are carried out with the understanding of equilibrium, to determine whether it can be reached and if the landscape will equivocally change.

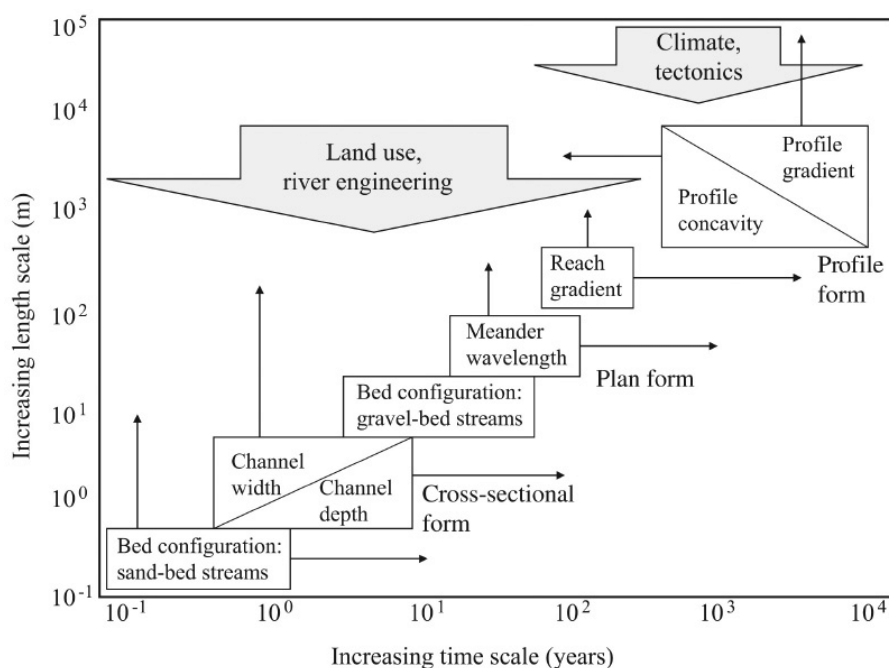


Figure 2- Time and spatial scale in the formation of UK fluvial landscapes (Giardino and Houser, 2015).

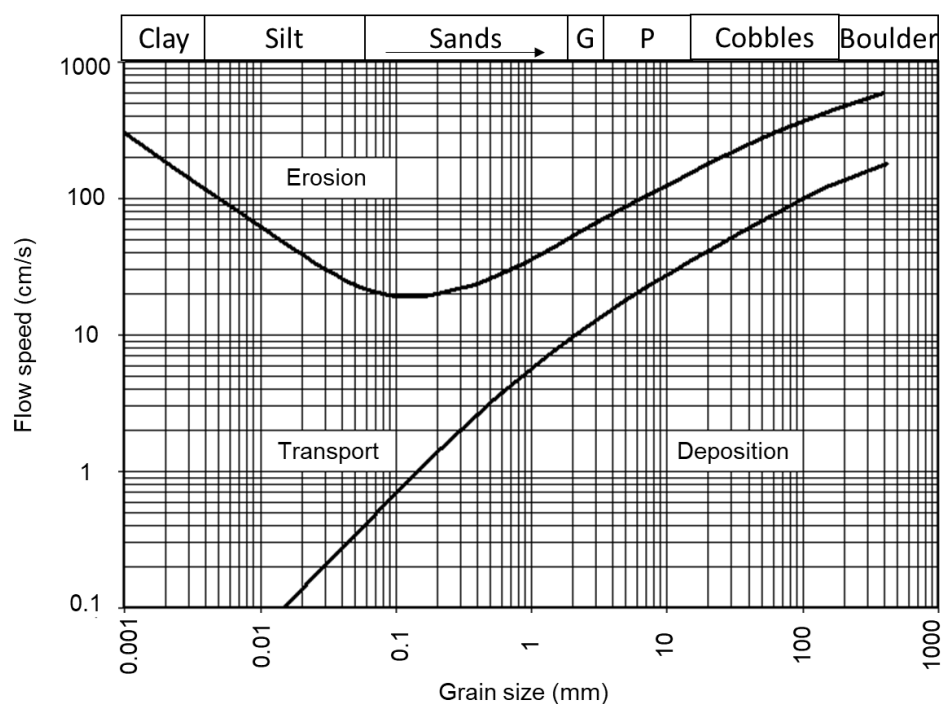


Figure 3- Hjulström curve of sediment mobility (Hjulström, 1935).

2.2 METHODOLOGY

- 2.2.1 A geomorphological assessment based upon a fluvial audit has been carried out to determine a baseline condition of the current study area. The assessment will provide both a current and historic overview of the catchment, aiding the impact assessment of current and proposed changes. Split into two sections; desk-based and a field survey, the existing sediment and

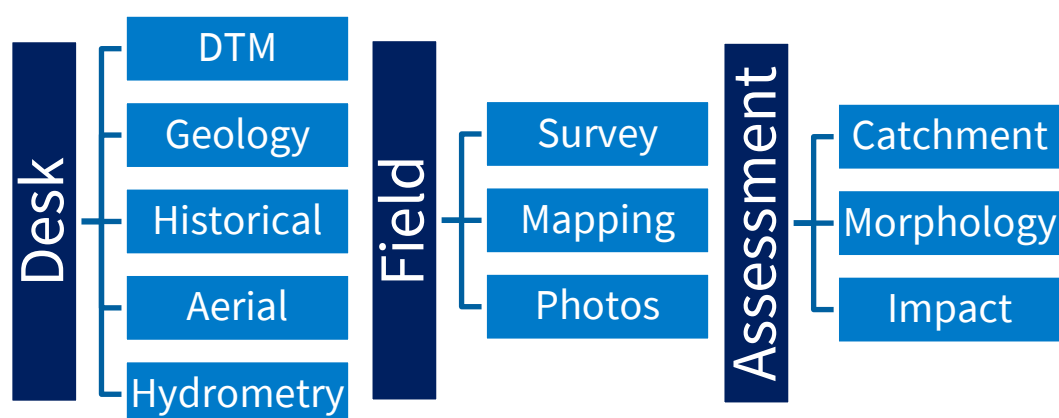
morphological regime will be reviewed. The proposed changes to the area will be assessed using the baseline conditions and the potential sediment and morphological impact.

DESK-BASED ASSESSMENT

- 2.2.2 A desk-based assessment was undertaken to determine the current catchments' fluvial network and its relationship with the landscape. Using remote sensed data from DTMs (OS Terrain 50 and LiDAR 1 m), fluvial features were extracted. Aerial images (Google Earth and Esri UK) are used to identify morphology within river channels and with respect to change. Historic maps were used to delineate the previous fluvial system and understand how much change has recently occurred. Catchment wide surveying of superficial geology, borehole surveys (British Geological Survey), catchment land use and land designations (MAGIC) to understand the sediment dynamics in the landscape. Flow data from the gauge at Pioneer Mills (EA) is used to understand the catchment response.

FIELD SURVEY

- 2.2.3 A field survey was undertaken on the 30th and 31st August 2022 by Tetra Tech geomorphologist Alexander Osborne. The site and its immediate vicinity were walked over to identify the baseline condition of the River Irwell (upstream and downstream of HG proposed outflow). The HG was inaccessible due to high levels of vegetation and lack of public access. Channel material, geometry, flow type, dynamics and stability will be assessed following a standardised field reconnaissance logging sheet. Morphological data was subdivided into appropriate reach scales of similar character, aiding in the study of sediment sources, sinks and transport processes. Photographs were taken to highlight reach characteristics.



3.0 DESK-BASED ASSESSMENT

3.1 CATCHMENT OVERVIEW

- 3.1.1 The River Irwell and subsequently the HG are sourced from the north in Lancashire, with a catchment area of 168 km² as shown in (Figure 4). The River Roch, a major tributary joins 3.0 km downstream passed the inflow point of the HG, with a catchment area of 193 km². Each river flows through farmland, villages and towns before reaching the study area. The catchment drains a combined total area of 361 km² at the proposed outflow of the HG, a further 1.5 km downstream of the Irwell/Roch confluence.
- 3.1.2 From the Headwaters to the site, the River Irwell meanders across a glacial and glaciofluvial till superficial deposit. The River Roch is more linked to its headwaters, however, also meanders across glacial dominated sediment. Primarily the sediment is sand and gravels. Access of sediment from the piedmont to the river is unlikely given the size of the valley floors are up to 1.6 km wide. In entering the flood plain, the River Irwell still actively meanders, however, there is significant channel works which have either straightened (e.g. the section through Bury) or introduced structures such as weirs and culverts, giving a hydromorphological definition of heavily modified. Each of these structures will influence the transport, deposition and behaviour of the river. Active bank protection, as found near the study site will prohibit the natural meandering course of the river.

3.2 HISTORIC OVERVIEW

- 3.2.1 The River Irwell in this area has an industrial background, with the proposed site being an ex-papermill. The requirement for water led to the creation of artificial channels (Goit), allowing the abstraction of water from the River Irwell. Two channels were created, the HG and Bealey's Goit (BG), taking water from the River Irwell approximately 1.5 km north of the site.
- 3.2.2 The BG directly discharged into the Irwell from as early as 1844, using an outflow point at the west of the meander, appearing to follow the outline of a previously abandoned meander (Figure 5). The BG outflow was then redirected to the east of the meander, where the new proposed HG outflow is. The HG has had no direct outflow into the Irwell since its creation, with wastewater being passed through filter beds on the north bank of the BG or being stored in reservoirs. The BG has been subsequently redirected away from the site outflow, with the channel being infilled. The current outflow of the HG is undetermined.

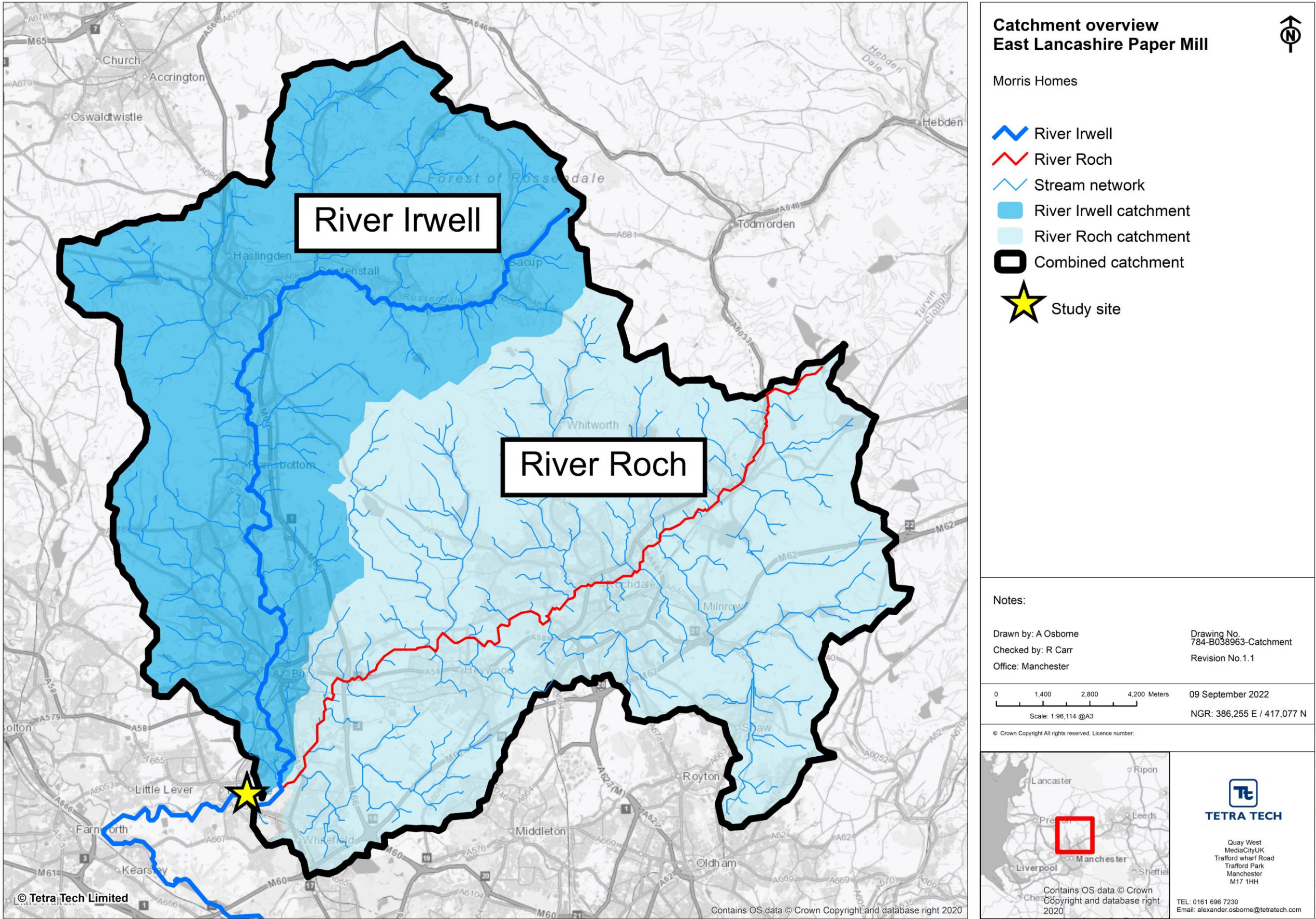


Figure 4- Catchment overview

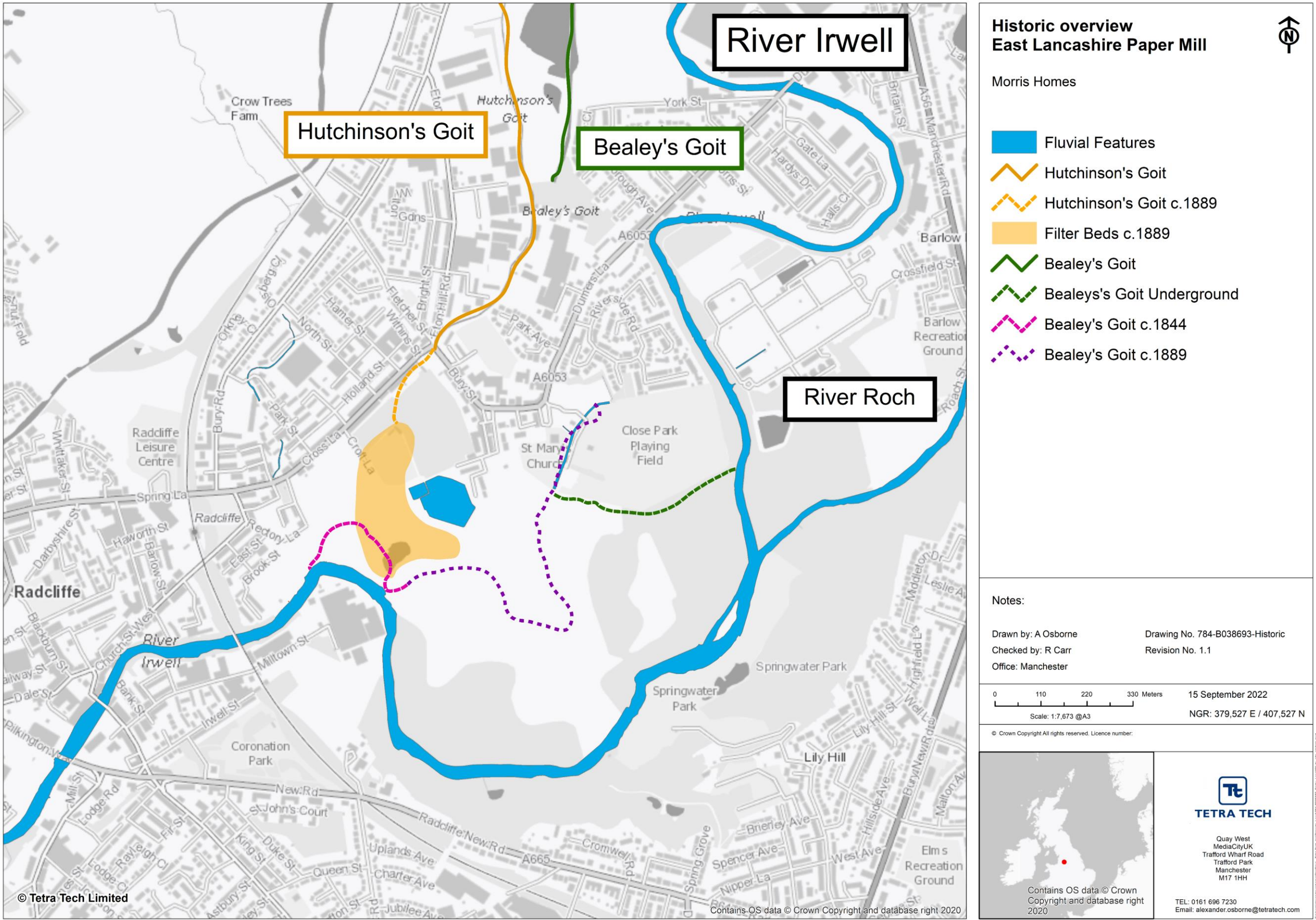


Figure 5- Historic overview.

3.3 STUDY AREA

- 3.3.1 The site is located at a crest of a River Irwell meander in the town of Radcliffe, with the designated geomorphological area of interest extending further north into the HG and River. The proposed site has superficial deposits of alluvial sediment, meaning it has at some point been linked to the natural deposition and transport regime of the Irwell. Local boreholes have sand/ gravel units up to 7.1 m deep, with the subsurface having detritus. The HG and the proposed new section will predominantly flow through this alluvial sediment, with a short 400 m section already flowing through glaciofluvial deposits.
- 3.3.2 Within the Irwell area of interest, the meander crest is heavily modified with bank protection on both banks, giving an unnatural appearance to the shape. There is evidence of modification using bank protection, culverts and weirs, and evidence that the existing wall reinforcement of the bank is experiencing undercutting. There is evidence from aerial photography that active deposition is occurring within the meander, forming a point bar. Further evidence of deposition is seen upstream and downstream of the site. The flow gauge situated at the west of the meander shows the normal range near the site to be between 0.36 – 3.70 m, with the highest recorded at 5.92 m (Figure 6).
- 3.3.3 The HG is an artificial channel that carries water from the Irwell towards, and through the site. The HG is flow regulated using a flow restriction mechanism, limiting the maximum amount of water that can flow through, up to a maximum discharge of $0.5 \text{ m}^3\text{s}^{-1}$. The HG is therefore linked to the Irwell's flow regime, reaching a limit inflow. Sediment within the HG is thought to be localised sediment. Additional inflow increases the discharge to an estimated maximum of $0.75 \text{ m}^3\text{s}^{-1}$.

SITE PROPOSAL

- 3.3.4 The proposal for the HG on site is the establishment of a channel originating onsite connecting the HG to the reservoir (Lodge), with around 200 m of new channel (Figure 7). The reservoir is to then have an outflow, roughly 100 m from the entry point, through a spillway leading to the Irwell a further 225 m downstream. The outflow point was the previous outflow for the BG up until it was redirected. The proposed channel is to be up to 6 m wide.
- 3.3.5 The proposal for the River Irwell adjacent to the site is to lower the existing wall, to be replaced by a more naturally-graded earth bank with approximately a 1:3 gradient. At present, there is evidence that the wall is being undercut, suggesting that the channel is too narrow to convey the quantity of water within the river. It is anticipated that reprofiling the bank will increase the overall width of the channel, especially during higher flows, and that it will remove the existing artificial constraints on the channel dimensions. In turn it is anticipated that this will result in better conveyance of flows within the channel, and improvements on the spatial transport and deposition of sediment. In turn this is likely to improve conditions and to enable habitats to thrive within the river channel.

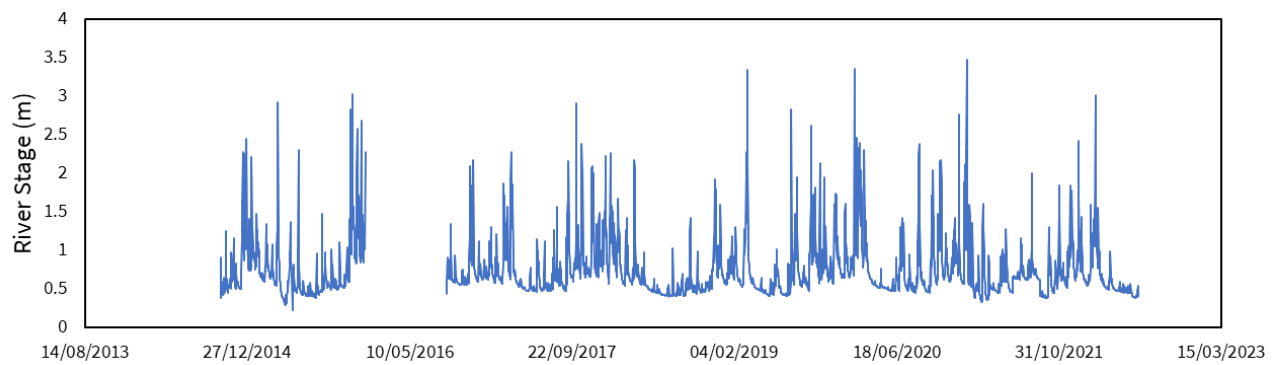


Figure 6- Hydrograph of the River Irwell located at Pioneer Mill (Data source: Environment Agency).

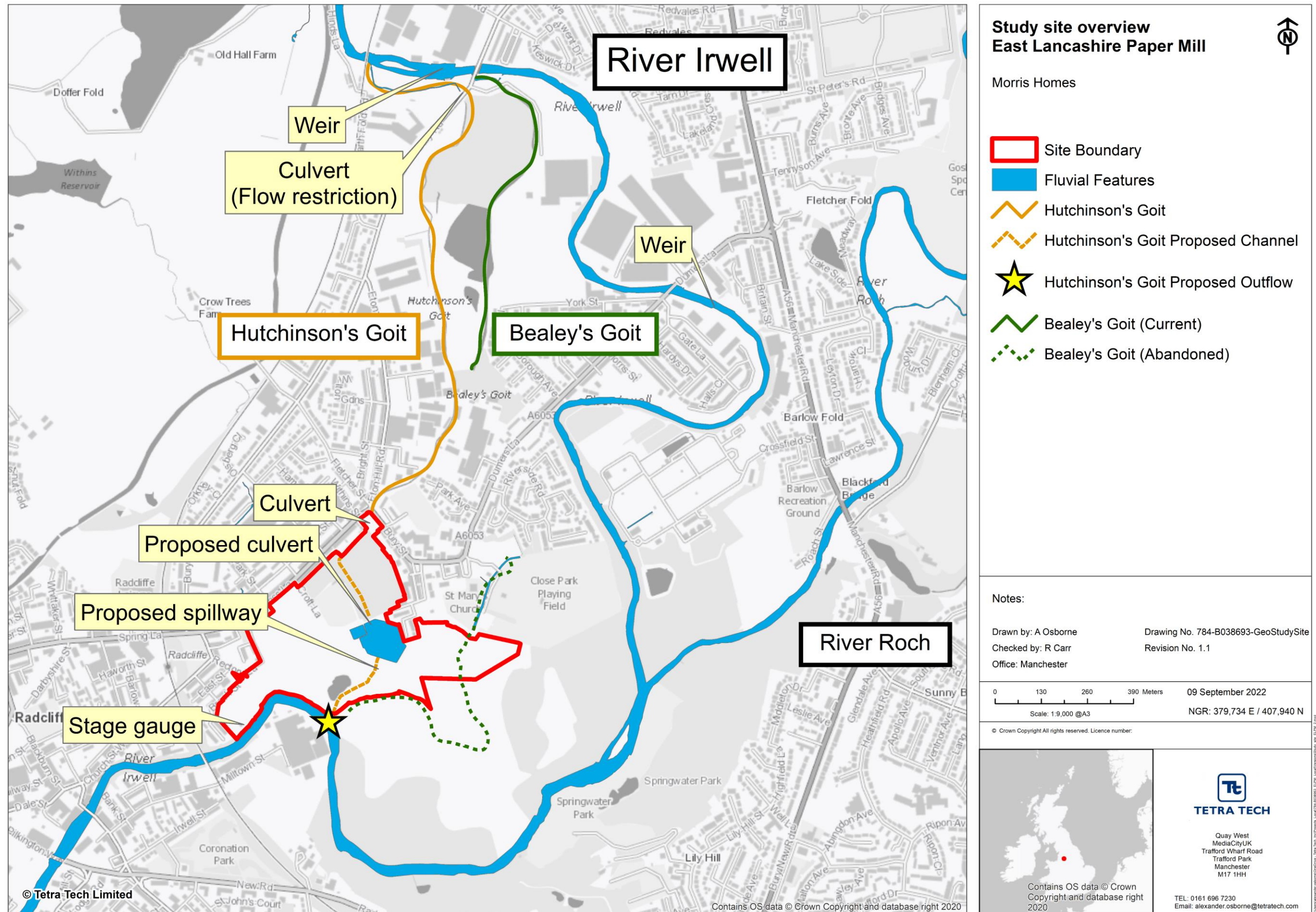


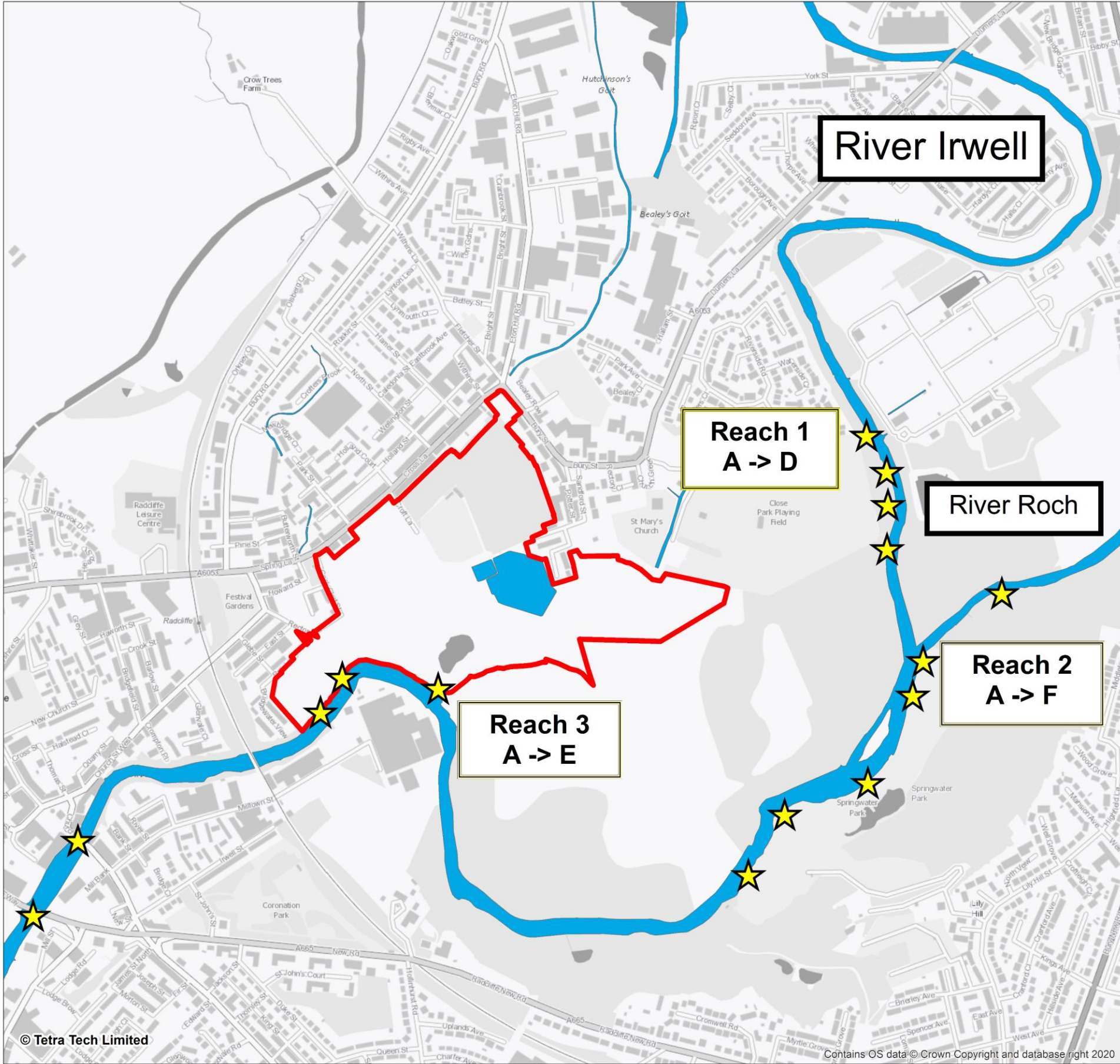
Figure 7 – Study site.

Table 1- Summary of study site.

Characteristic	Description
Site area	0.21 km ²
Superficial geology	Unconsolidated alluvial sediments (clay, silt, sand and gravels) sourced from the River Irwell. Towards the north of the site there are glaciofluvial deposits (sand and gravel). Geology may contain remnants from previous site usage.
Bedrock geology	Bedrock geology is formed from the Pennine Middle Coal Measures formation (locally up to 200 m thick). Composed of mudstone, siltstone, sandstone and coal seams.
Borehole	Mixture of silty sand and lenses of clay, woody debris, sand and gravels.
Hydrology	The Hutchinson's Goit is an artificial channel created to take water from the River Irwell. Flow is controlled at inflow from the Irwell with a maximum discharge of 0.5 m ³ s ⁻¹ . Water is held in a reservoir (Lodge). No current outflow is observed.
Water inflow	Hutchinson's Goit (River Irwell)
Water outflow	Unknown/ retained in reservoir.
Land use	Classification of brownfield site.
Designations	Site designated as built up area. Within SSSI impact zone for Ash Clough and Nob End SSSI. Ash Clough is a geological exposure on the river cliff downstream.

4.0 FIELD SURVEY

- 4.1.1 A field survey was conducted on the 30th and 31st August 2022, with the weather being dry and sunny. Antecedent conditions are relevant since as coming out of summer the river levels are low, enabling views of bed material to be seen. Due to high levels of vegetation and limited access the HG could not be surveyed safely. The River Irwell was surveyed in 3 specific reaches to include, before, at and after the proposed outflow of the HG, and including the existing bank wall along the length of the site. Land was accessed using public footpaths but due to the site condition and general Irwell riverscape certain sections were unable to be accessed. It would not be possible to walk a complete survey around the site, meaning aerial photos are used to fill in any gaps where possible.
- 4.1.2 Figure 8 shows the reach locations of the survey and broken down into cross sections. The bank direction is as directed from looking downstream.



**Photo locations
East Lancashire Paper Mill**

Morris Homes

- Fluvial Features
- Site Boundary
- Photo Locations

Notes:

Drawn by: A Osborne
Checked by: R Carr
Office: Manchester

Drawing No. 784-B038693-GeoPhotoLoc
Revision No. 1.1

0 100 200 300 Meters
Scale: 1:7,000 @A3

09 September 2022
NGR: 379,516 E / 407,526 N

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Figure 8- Map of photo locations.

Photo survey – Reach 1

R1A (53.56563, -2.30212)

River Irwell north of River Roch confluence.

- Heavily vegetated banks.
- Evidence of basal bank scour.
- Bed composition of cobble to gravel sediment.
- River noticeably clear of suspended sediment.



R1B (53.56502, -2.30154)

River Irwell north of River Roch confluence.

- Heavily vegetated banks.
- Banks composed of sand/ silt sediment.
- Basal scouring found.
- Proto-side bar formation
- No change to bed composition since previous.



R1C (53.56446, -2.30150)

River Irwell north of River Roch confluence.

- Bank protection using gabion baskets.
- Increase in suspended sediment.
- Full bank scour noticed on right bank.
- Pooling sequence.



R1D (53.56372, -2.30152)

River Irwell north of River Roch confluence and at Bealey's Goit outflow.

- Basal scour on left bank and side bar creation.
- Side bar formation and full bank scour on right bank.
- Riffle section.
- Sediment aggrading slightly finer to previous.



Photo survey – Reach 2

R2A (53.56298, -2.29826)

River Roch around 50 m upstream of confluence with Irwell.

- Basal scour on right hand bank with full scour on left.
- Built up embankment/ footpath.
- Bedload is predominantly cobble to gravel grade.



R2B (53.56183, -2.30048)

River Irwell/ Roch confluence.

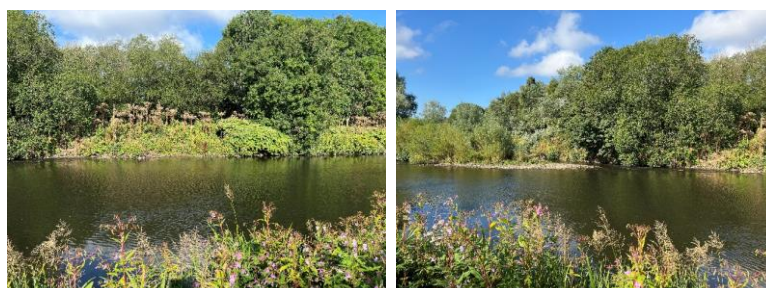
- Gravel to pebble sized side bar.
- Bedload is noticeably finer than the Roch.
- Banks are predominantly silt/sand.
- Bank stabilisation on left bank using green engineering.



R2C (53.56125, -2.30078)

River Irwell.

- Pool/ riffle sequence.
- Mature island in centre of channel, with cobble sized material.



R2D (53.55977, -2.30204)

River Irwell at middle of Island in channel.

- Near anabranching channel configuration.
- Banks are noticeably more exposed, with full scour occurring.
- Evidence of bank protection within the bank.
- Bed material is coated in silt.



R2E (53.55923, -2.30440)

River Irwell before landslide hazard.

- Active channel protection on right bank (site).
- Large side bar
- Artificial bank with green engineering. Partial failure of bank.



R2F (53.55820, -2.30542)

River Irwell. Last accessible location before site.

- Large side bar on right bank.
- Left hand bank has active bank protection.
- Channel appears deepened at this section.



Photo survey – Reach 3

R3A (53.56133, -2.31424)

River Irwell at proposed outflow of HG.

- Due to vegetation clear views of either bank are difficult.
- Right hand bank is made from silt/ sand material.
- Bedload is of gravel/pebble to sand in size.
- No relic sediment structures from previous BG outflow
- Unable to access relic channel due to prevalence of Giant Hogweed.



R3B (53.56151, -2.31696)

River Irwell at crest of meander.

- The River Irwell is constrained to follow the bank on the outer side. There is evidence that undercutting of the structure is occurring.
- Point bar is fragmented, with it being partially vegetated.
- Exposures of bedrock are found, especially near old bridge piers.



R3C (53.56092, -2.31758)

River Irwell past site boundary.

- The river is noticeably sediment laden in suspension.
- The bed is coated in fine silt.
- River condition is generally poor with detritus.



R3D (53.55873, -2.32444) River Irwell from Blackburn Street. - Channel is confined on both sides. - Deposition of pebble to cobble sized sediment in side and mid-bars. Mature island formed.	
R3E (53.55747, -2.32570) River Irwell from Pilkington Way. Mature depositional structures, with large bars being formed. Evidence of vegetation growing.	

- 4.1.3 The River Irwell shows evidence of pool-riffle sequencing throughout and has mature depositional landforms. Geomorphologically the Irwell is in equilibrium with its surroundings, with no evidence of extreme deposition or erosion. Substantial work around the Springwater Park has not adversely affected the river. River bed material is between cobble to gravel sized indicating that material of this level can be transported since local banks are not local sources. Suspended sediment sources are difficult to pinpoint, due to different mechanisms of entrainment. Around Reach 3C there was heightened suspended sediment indicating a potential point source, or that there is a local slowing of the river. It is noted that there is currently a wall along the river bank adjacent to and downstream of the site, which may serve to constrain the flow into a narrower width than appropriate for the river, thus possibly resulting in an artificially slowed flow. The River Irwell does contain suspended sediment and shows local dropout of this finer grade. Noted is how exceptionally dry it was at the time of undertaking the walkover, and that during normal flow condition these settled fines will be quickly transported.

5.0 GEOMORPHOLOGICAL IMPACT

- 5.1.1 The impact of the proposed works is assessed to be minimal regarding the sediment introduction to the Irwell. The new channel leading to the reservoir (Lodge) will carry the existing sediment into a new sediment sink, meaning any transported material will be deposited within the reservoir due to a sudden loss of flow velocity when entering. Since the outflow of the current HG is undetermined, existing sediment is being stored within the channel system. From aerial photography and Google Street view the HG appears to be sediment choked with vegetation impacting flow. Creating a new outflow will enable the channel to flow without obstacle, which should help relieve the impaction. With water leaving the reservoir through a spillway, the sediment being transported will be graded to fine particles (clay/ silt).
- 5.1.2 The spillway to the Irwell will be a new source of sediment to the Irwell, but localised. It is possible that larger sediment grains, up to sands and gravels will be mobilised and entrained in the flow. With the outflow into the Irwell being the same as the BG, it can be assumed that equilibrium was reached with the Irwell in the past. HG entry to the Irwell will cause a localised slowdown depending on the flow velocity of both, which can lead to local dropout of sediment. However, no noticeable delta was built by the BG and given that the sediment source is substantially smaller, it is unlikely to cause formation of river structures. Within the Irwell at this location there is already increased suspended sediment and settling.
- 5.1.3 There is an increased chance of suspended material being taken by the flow from the reservoir and the spillway. That will heavily depend on the antecedent condition, and if material can fallout in the reservoir. During periods of enhanced flow, suspended sediment will be more likely to flow from the reservoir to the Irwell. As the Irwell and HG are linked, the Irwell at that point would also be seeing an increase in suspended sediment, with local sources upstream for example at Springwater Park. Suspended sediment is part of the natural processes of a river when in flood, with the suspended sediment being deposited on floodplains.
- 5.1.4 The outflow is on the outer bank of the meander, meaning it has the greatest flow velocity, and a zone of transport and erosion. Any sediment entry to the meander at this site should be easily removed. Further downstream of the site there is adequate surplus in the Irwell's sediment budget, with no evidence of silting up of the channel. Given the survey was conducted during very low river levels, the flow of the Irwell was robust.
- 5.1.5 It is proposed that the wall along the bank adjacent to the site is lowered to bed level. It is understood that this will comprise a more naturally graded earth bank of approximately a 1:3 gradient, which will enable the river to function naturally in response to flow variations. If the reach downstream of the proposed HG outfall is not constrained by the presence of a wall, it is possible that slowing of flows will be mitigated, and consequently the excessive deposition of sediment may encourage natural river dynamics, including greater equilibrium in sediment size distribution across the reach and the wider catchment. In turn, this is likely to reduce any areas that may otherwise be choked by fine sediment, especially in case of a sediment influx from the HG outflow. As a result, the proposed bank is likely to have an overall positive effect on the morphological quality of the River Irwell adjacent to the site.

6.0 RECOMMENDATIONS AND CONCLUSION

6.1 RECOMMENDATIONS

6.1.1 The recommendations from this assessment are as follows:

- Sediment generated from site works is at risk from entering the Irwell, especially from bank working around the channel. That is a far greater risk to the channel geomorphology with bulk sediment being deposited into the channel, rather than a new channel being formed. It is recommended that sediment trapping is undertaken and that sediment being deposited into the channel is minimised.
- Newly exposed bank material in the compensation will be easily eroded. Bank stabilisation measures such as established grassed vegetation or harder engineered solutions may be required to allow bank stabilisation of loose material should be undertaken to avoid runoff into the Irwell.
- The new proposed channel is being created into old alluvial sediment which is very easily reworked by river processes. It is therefore important to consider the channel design and slope to avoid over steepening of the channel. Sediment will be reworked by the HG, but primarily during storm events when increased flow into the HG is facilitated by the Irwell.
- Over time the reservoir (Lodge) will become filled with fine sediment, leading to lower capacity within. It is recommended that sediment is removed from the reservoir to maintain its capacity.
- The proposed re-grading of the Irwell bank, including the lowering of the existing wall, may increase the sediment load on a local scale during the construction stage. However, post-implementation, this is likely to result in a river that is less constrained by its artificial bank, which will reduce likelihood of slower flows upstream. In turn the resulting sediment transport is likely to be more consistent on the reach scale, and is less likely to result in excessive deposition of fine sediment. It is recommended that the re-profiled bank is suitably maintained to ensure that excessive erosion does not occur and that the hydrological regime of the river in conjunction with the updated HG does not increase the deposition of fine sediment into the river.

6.2 CONCLUSION

- 6.2.1 The proposed outflow of the HG into the River Irwell is deemed to have a limited geomorphological impact if the recommendations are followed.
- 6.2.2 The proposed wall lowering is likely to improve the consistency of flows within the river, and is likely to encourage a more natural hydrological regime associated with variations in flow, and so is likely to have an overall positive impact on the channel condition.
- 6.2.3 Geomorphological time scales stretch from years to hundreds of years, therefore any changes to the system can potentially only manifest after significant time has passed. It is this assessment's conclusion that the long-term effect of the proposed development on the geomorphological condition of the Irwell is minimal.

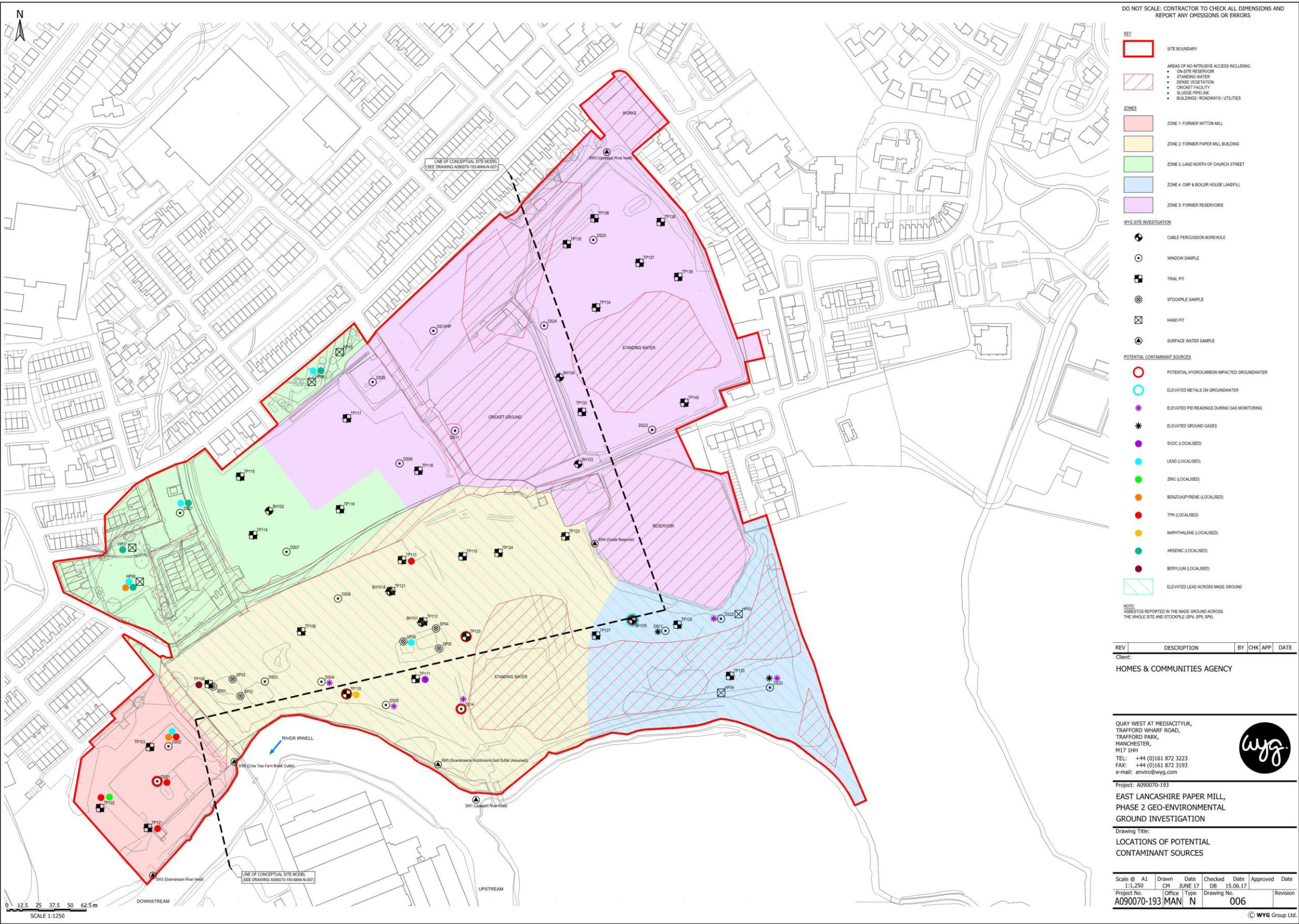
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APPENDIX E: GEO-ENVIRONMENTAL MAP



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