

## Technical Note

**PROJECT: MAPLE LODGE, HERTFORDSHIRE PLANNING  
APPLICATION PEER REVIEW**

---

Rev. Ref.	Date	Prep	Chk	App	Amendments	Reason for Issue
0	08/03/2022	RT	RT	RT	ORIGINAL	FOR INFORMATION / REVIEW

## CONTENTS

---

<b>INTRODUCTION AND BACKGROUND .....</b>	<b>1</b>
<b>SCOPE.....</b>	<b>1</b>
<b>DOCUMENTS REVIEWED.....</b>	<b>1</b>
TIER CONSULT, 25 FEBRUARY 2021 – A FLOOD RISK ASSESSMENT AND DRAINAGE STRATEGY FOR MAPLE CROSS, RICKMANSWORTH (DOCUMENT REF. T/17/1999/FRA ISSUE 1.6) .....	2
H FRASER CONSULTING, 02 MARCH 2021 – MAPLE CROSS CONTAMINATED LAND ASSESSMENT AND DETAILED QUANTITATIVE RISK ASSESSMENT FOR CONTROLLED WATERS (DOCUMENT REF. 30422R1D1.5).....	3
TIER CONSULT, 02 MARCH 2021 - PILING METHOD STATEMENT AND RISK ASSESSMENT FOR MAPLE CROSS, HERTFORDSHIRE (DOCUMENT REF. TL1177PMSRA1.2 ISSUE 1.4).....	3
H FRASER CONSULTING, 24 MARCH 2020 – GROUNDWATER FRAMEWORK AGREEMENT (DOCUMENT REF. 30422TN2.4 TECHNICAL NOTE VERSION 4.0).....	2
H FRASER CONSULTING, 07 JUNE 2021 – MAPLE LODGE RESERVE HYDROGEOLOGICAL IMPACT ASSESSMENT AND GQRA (DOCUMENT REF. 30422R3) .....	4
H FRASER CONSULTING, 16 DECEMBER 2021 – MAPLE LODGE RESERVE HYDROGEOLOGICAL IMPACT ASSESSMENT DECEMBER 2021 UPDATE (DOCUMENT REF. 30422R3.1) .....	5
OTHER DOCUMENTS .....	5
<b>CONCLUSION.....</b>	<b>6</b>

## APPENDICES

---

APPENDIX A DOCUMENT LIST

## INTRODUCTION AND BACKGROUND

---

This Technical Note is intended to review a planning application for a development site in Maple Cross, Hertfordshire. The planning application reference number is 21/0573/FUL, and address is Maple Lodge, Maple Lodge Close, Maple Cross, Hertfordshire. The proposed development includes a to provide 2 no. warehouse Class E(giii)/B2/B8 units comprising a total of 16,115 sqm including 1,882 sqm ancillary E(gi) office space, access, landscaping and associated works.

From council email: "The majority of the site is located within Flood Zone 1, however, a narrow strip to the eastern and southern boundaries lies within Flood Zone 2. Maple Lodge Farm Ditch Main River runs along the west boundary of the site. The site lies within Groundwater Source Protection Zone 1 and within close proximity to an Affinity Water potable groundwater abstraction. Maple Lodge Nature Reserve (MLNR), a Local Wildlife Site (LWS) and Groundwater Dependent Terrestrial Ecosystem (GWDTE) is located to the south-east of, but not immediately adjacent to, the application site. It extends to approximately 40 acres and consists of lakes, a marsh, hedgerows and a wooded plantation.

The application was recommended for approval by Officers (subject to conditions/S106 agreement). Whilst there are no objections (subject to conditions) from the Environment Agency, Thames Water or Lead Local Flood Authority, there is a high level of concern locally regarding the application and Members of the Planning Committee were not satisfied that the risks the development may pose to the MLNR had been fully understood or that the suggested conditions would ensure there was no harm. As such, Members resolved to defer the planning application; 'for the Council to instruct their own expert hydrologist or similar (as necessary) to review the application, in particular in respect of the impacts of the proposal on ground water and the adjacent Nature Reserve'."

## SCOPE

---

The purpose of this service is for an independent hydrogeological review of planning supporting documents for a development site at Maple Lodge, Maple Lodge Cross in Hertfordshire.

We undertook the following scopes of works:

- Independent review of the No.278 documents listed within planning application documents on the [threerivers.gov.uk](https://www.threerivers.gov.uk) planning website and the 2021 GQRA report.
- Review of the site investigations, method statements, conclusions, recommendations, and outcomes.
- Advise for further investigation or following actions if required.

The technical note will summarize and point out key components related to setting out the findings, observations and bring towards a conclusion in respect to the impacts of the proposal on the groundwater and adjacent Nature Reserve for the planning application.

## DOCUMENTS REVIEWED

---

The initial review consisted of No.278 documents listed within the planning website (listed in Appendix A), H Fraser Consulting 2021 GQRA Report and H Fraser Consulting 2021 DQRA Report. Additional documents were provided in February 2022:

- Tier Consult, 27 May 2021 – Asbestos Removal Verification Report for Maple Cross (Document Ref. TL1177-TE-00-XX-GE-RP-001-V01);
- H Fraser Consulting, 24 March 2021 - Groundwater Framework Agreement (Document Ref. 30422TN2.4); and
- H Fraser Consulting, 16 December 2021 - Hydrogeological Impact Assessment December 2021 update (Document Ref. 30422R3.1).

Selected documents are specifically identified below leading into a conclusion of the technical note at the end of the document, other documents were reviewed in this independent review for the planning application and are not deemed insignificant and were included in the conclusion thought process, however, for a concise technical note required limitations of text.

## H Fraser Consulting, 24 March 2020 – Groundwater Framework Agreement (Document Ref. 30422TN2.4 Technical Note Version 4.0)

A Technical Note summarizing potential risks for each concern raised by Affinity Water's objection to the planning application on the grounds that piling in the area poses a risk.

### Key Points

- The document provides a summary of each risk identified by Affinity Water as part of their planning application objection:
  - Creating potential pathways between shallow gravel groundwater and deep chalk groundwater potentially allowing naturally occurring manganese present in the gravel aquifer to migrate to the chalk.
  - As above, but this also applies to other hypothetical contaminants potentially present
  - Turbidity during piling causing Public Water Supply groundwater sources to reach above 1 NTU1 and shut down.
  - Piling potentially blocking significant fissures hence creating a "curtain" effect. This could hypothetically cause the flow paths to change around groundwater sources, potentially causing greater drawdown for the same output.
- Third parties also objected that dewatering during construction may affect local water features.

### Notes

- These risks are further discussed and addressed in the later environmental reports (including 2021 HIA and GQRA, 2021 Piling Method Statement and Risk Assessment, 2021 DQRA, and 2021 Tier Consult Supplementary Site Investigation).

## Tier Consult, 25 February 2021 – A Flood Risk Assessment and Drainage Strategy for Maple Cross, Rickmansworth (Document Ref. T/17/1999/FRA Issue 1.6)

A revision of a previous report which accompanied the refused planning application, which this report considers the amendments and revisions of revised scheme.

### Key Points

- Site plans include discharging foul water to the public sewer to the north of the site with the existing foul public sewer within the site.
- Surface water runoff discharge is recommended to have a flow control device.
- Attenuation storage to be incorporated into the site layout before discharge to the Maplelodge Ditch (the western boundary drainage ditch leading into the Maple Lodge Nature Reserve – Clubhouse Lake). "Due to the site ground levels, the discharge will be pumped." Size of the attenuation storage was calculated to accommodate the 100-year rainfall event plus 30% climate change contingency.
- Soil at the site is freely draining with a high permeability.
- Based off the soakaway tests, surface water runoff via infiltration methods will not be feasible due to the high groundwater table and narrow unsaturated zone preventing effective operation over a full seasonal cycle.

### Notes

- The surface water runoff discharge flow control device will most likely be incorporated into the OEMP for the site, along with the surface water management strategy.

## H Fraser Consulting, 02 March 2021 – Maple Cross Contaminated Land Assessment and Detailed Quantitative Risk Assessment for controlled waters (Document Ref. 30422R1D1.5)

The assessment was written with the objectives: to address concerns outlined by the inspector and support a further planning application; provide a contaminated land assessment; and to inform a piling method statement.

### Key Points

- S1.1 - Written in conjunction with the Piling Method Statement and reduced the depth of piles from 15m to 10m and changes to methodology and sequencing to reduce potential risks to PWS boreholes.
- S13 – Mitigation and Monitoring - The following measures are proposed to mitigate against the potential effects of piling on groundwater quality in the Chalk aquifer and impacts on the PWS boreholes:
  - Piling method statement and risk assessment
    - Piling method
    - Depth of piling
    - Rate of piling
    - Good workmanship, monitoring of the piling operation, record keeping
  - Densification of the piling zone
  - Timing of the piling operations
  - Monitoring groundwater during piling
  - Trigger and action levels for DO and turbidity
  - Monitoring after piling

### Notes

- The document was written in correspondence and reviewed by Affinity Water regarding potential risk towards the PWS abstractions.
- Mitigation measures to be implemented and incorporated into the monitoring programme, CEMP and/or OEMP.

## Tier Consult, 02 March 2021 - Piling Method Statement and Risk Assessment for Maple Cross, Hertfordshire (Document Ref. TL1177PMSRA1.2 Issue 1.4)

A document to design and detail the piling, foundation solution, and methodology to be employed taking into consideration the concerns by Affinity Water in their initial planning application objections.

### Key Points

- S1 – “A separate dewatering method statement and risk assessment will be produced in due course to address the final point above, and as such, is outside the scope of this document.” This final point above is a reference to an objection by Affinity Water to the effect that “dewatering during construction may effect local water features”.
- S6 - On the basis of the site investigation, monitoring and risk assessment works conducted to date, the following measures are considered be sufficient mitigation:
  - 1. Piling zone depth – typical pile lengths of 10m bgl (from existing ground level);
  - 2. Piling method (displacement methodology and rate of piling);
  - 3. Densification of the piling zone and consideration of the sequencing of the piling to form a ‘compaction barrier’ hydraulically down gradient first;

- 4. Monitoring during piling works;
- 5. Action and trigger levels

### Notes

- A Dewatering Method Statement and risk assessment has not been produced by the time of this review of the planning application documents.
- The document was written in correspondence and reviewed by Affinity Water regarding potential risk towards the PWS abstractions.
- Mitigation measures described in the report to be employed along with appropriate/stated lines of communication with Affinity Water, Local Authority and Environmental Agency.

## **H Fraser Consulting, 07 June 2021 – Maple Lodge Reserve Hydrogeological Impact Assessment and QRA (Document Ref. 30422R3)**

Report for the assessment of the potential impacts of the development site on the Maple Lodge Reserve.

### Key Points

- S2.2 “The piling method does not use wet grout or cement, but introduces a pre-formed concrete pile to the ground, pushing soils aside and creating a compressive zone around the pile. The method will therefore not create a ‘grout curtain’ effect by grouting up groundwater pathways between the piles. The compressive zone around the pile tends to be self-sealing, mitigating against the formation of pathways for groundwater transport up or down the pile shaft.”
- S.2.3 “The Maple Lodge Reserve is an area of 16 hectares comprising of a lake, marsh, hedgerows and woods. The site is not a designated Local Nature Reserve registered with Natural England, but is an area of land privately owned with access for members of the Maple Lodge Conservation Society.”
- S2.3.1 “Clubhouse is a very shallow lake (c.0.5m) where prolonged low water level periods have naturally caused pools to dry and habitat use has succeeded as it would naturally to more marsh land with some terrestrial species such as willowherbs present in the lake margins.”
- S8 Table 8-1 details the risk assessment for a number of sources with pathways, receptors and potential impacts, all deemed with a “Negligible Risk”.
- **S9 Mitigation** “It is not anticipated that there will be an impact on the Maple Lodge Reserve or on any groundwater dependent terrestrial ecosystems that may exist there. However, an extensive programme of monitoring is proposed during the piling activities to protect local PWS borehole abstractions. These mitigation measures will also serve to provide protection to the Maple Lodge Reserve. Relevant mitigation measures are:
  - A piling method statement to control the type of piles, method of piling and eliminate potential for contamination arising from piling activities or pathways for contaminant migration
  - Densification of the piling zone and the sequence of piling will be used to reduce permeability and hence potential for turbidity transport
  - Groundwater monitoring will be undertaken to include groundwater levels, turbidity and dissolved oxygen (as a proxy for manganese). Increase in concentrations above baseline will therefore be detected
  - Monitoring after piling for a period of eight weeks to capture potential transport of turbidity or manganese and observe changes in groundwater elevations
- In addition, the following mitigation is proposed to control impacts of site operations on the water environment:
  - Construction activities will be managed by a Construction Environment Management Plan (CEMP) which will set out good practice for minimisation of environmental impacts. The CEMP will include instructions on management of run-off and drainage, management of

stockpiles, management of storage and use of hazardous fluids and substances. This will prevent an increase in sediment loading to the western boundary stream and prevent release of hazardous chemicals to the environment.

#### **Notes**

- Of the time of this independent review, there has not been a CEMP developed for the site and needs to be created and approved prior to start of development works.
- Mitigation monitoring measures to be incorporated into the overall scheme of monitoring programme, CEMP and/or OEMP.

### **H Fraser Consulting, 16 December 2021 – Maple Lodge Reserve Hydrogeological Impact Assessment December 2021 Update (Document Ref. 30422R3.1)**

Updated report for the assessment of the potential impacts of the development site on the Maple Lodge Reserve based on the additional data from interim monitoring.

#### **Key Points**

- S3 – “When the groundwater flow direction is to the southwest, groundwater drains to the stream on the western boundary of the site, although it is possible that under dry conditions, groundwater is lower than the invert level of the stream.”
- S3 – “From the available site data, groundwater flow in the Chalk aquifer is predominantly to the south. It has been conservatively assumed that flow from the Chalk below the site contributes to discharge from the Chalk aquifer into Clubhouse and Marsh Lakes.”
- Conclusions - State multiple points to the effect of potential impacts of piling on water levels to be shown as negligible.

#### **Notes**

- Proposed groundwater monitoring programme stated within the Piling Method Statement and Risk Assessment, 2021 HIA and GQRA will detail the impacts of piling on water levels and quality.

### **Other Documents**

Numerous planning documents and responses were reviewed as part of this independent review, including documents and responses from Environmental Agency (EA), Affinity Water, Tier Consulting, H Fraser Consulting, and the local authority (Three Rivers District Council). Specific documents are identified below as being relevant to the conclusion to this technical note:

- Affinity Water letter to Planning Inspectorate, 23 February 2022 – Letter stating updated comments regarding the planning application: in regard to the total application; C12 Piling Method Statement; C19 Decommission of investigative boreholes; C31 Dewatering method statement (stating that NO dewatering shall take place with conditions if dewatering is required); and Conditions to be displayed on site.

## CONCLUSION

---

Based off a review of the initial documents provided, three additional documents provided in February 2021 and Affinity Water February 2022 planning inspectorate letter, the following recommendations/conclusions have been made in respect to the impacts of the proposal on the groundwater and adjacent Nature Reserve for the planning application.

### Recommendations

A planning condition for a Construction Environmental Management Plan (CEMP) to include:

- A plan for mitigation for all construction activities to be established and approved with the local planning authority prior to commencement of works. To fulfil the requirements stated in the HFC 2021 HIA and GQRA: *Construction activities will be managed by a Construction Environment Management Plan (CEMP) which will set out good practice for minimisation of environmental impacts. The CEMP will include instructions on management of run-off and drainage, management of stockpiles, management of storage and use of hazardous fluids and substances. This will prevent an increase in sediment loading to the western boundary stream and prevent release of hazardous chemicals to the environment.*
- To be established in conjunction with the Piling Method and Risk Assessment, and Dewatering Method Statement (if applicable), to mitigate/prevent any risk to the groundwater, surface water, and Maple Lodge Nature Reserve.

A planning condition for an Operational Environmental Management Plan (OEMP) to include:

- Initially a short-term and possible long-term monitoring of the groundwater and surface water to show that there is no impact on the groundwater, surface water or Maple Lodge Nature Reserve from post construction phases and operational phases as compared to baseline values. To include the proposed monitoring programme stated within the Piling Method Statement and Risk Assessment.
- Environmental management controls to be implemented for operational phases of the proposed development with appropriate remediation risk options.

It is currently unknown if dewatering shall take place, if dewatering will be required, then a Dewatering Method Statement (DMS) must be submitted and approved in writing with the Local Authority prior to the dewatering works. The DMS must include details about the dewatering method, predicted impact on the groundwater, and proof/details of consultation with Affinity Water about the proposed dewatering activities and methodology.

A monitoring programme of the surface water environment (Maple Lodge Ditch) to be implemented during the construction and operational stages of the development (within the CEMP and OEMP), to be in appropriate locations to be utilized to determine whether or not there is a direct or indirect impact on the Maple Lodge Nature Reserve. If allowed, the proposed surface water sampling locations stated within the Tier 2021 Piling Method Statement to be implemented as part of the surface water monitoring programme.

Mitigation measures detailed in the HFC 2021 DQRA to be incorporated and implemented into the proposed developments management plans. To have a have appropriate Action Level exceedance mitigation measures to be put into place in the case of a risk event caused by the construction or operational stages of the development, as stated within the Piling Method Statement and Risk Assessment.

### Final Statement

Following that the recommendations lined above are completed in full and all appropriate mitigation measures are put into place and followed through during the construction and operational stages of the development, the proposed development's effect on the groundwater and Maple Lodge Nature Reserve can be managed and appropriately mitigated.

## Appendix A

### Document List



<b>Date Published Online</b>	<b>Drawing Number (if applicable)</b>	<b>Description</b>
8/3/2021		Application Form
8/3/2021		Biodiversity Checklist
8/3/2021		Covering Letter
8/3/2021		Heritage Statement
8/3/2021		Supplementary Site Investigation 1A
8/3/2021		Supplementary Site Investigation 1B
8/3/2021		Supplementary Site Investigation 2
8/3/2021		Supplementary Site Investigation 4
8/3/2021		Method Statement for Monitoring Well Decommissioning
8/3/2021	17019-C4P-AV-00-DR-A-0100 REV P5	LOCATION PLAN
8/3/2021	17019-C4P-B2-ZZ-DR-A-2000 REV P4	PROPOSED FLOOR PLANS - UNIT 2
8/3/2021	17019-C4P-B2-R-DR-A-2001 REV P4	PROPOSED ROOF PLAN - UNIT 2
8/3/2021	17019-C4P-B1-R-DR-A-2001 REV P4	PROPOSED ROOF PLAN - UNIT 1
8/3/2021	17019-C4P-B1-ZZ-DR-A-2100 REV P5	PROPOSED ELEVATIONS - UNIT 1
8/3/2021	17019-C4P-B2-ZZ-DR-A-2100 REV P4	PROPOSED ELEVATIONS - UNIT 2
8/3/2021	17019-C4P-B1-ZZ-DR-A-2000 REV P4	PROPOSED FLOOR PLANS - UNIT 1
8/3/2021	17019-C4P-AV-00-DR-A-0101 REV P4	EXISTING SITE PLAN
8/3/2021	17019-C4P-AV-ZZ-DR-A-0700 REV P4	PROPOSED SITE ELEVATIONS
8/3/2021		DESIGN & ACCESS STATEMENT - PART 1
8/3/2021		DESIGN & ACCESS STATEMENT - PART 2
8/3/2021		DESIGN & ACCESS STATEMENT - PART 3
8/3/2021		DESIGN & ACCESS STATEMENT - PART 4
8/3/2021		GEO ENVIRONMENTAL REPORT - PART 1A
8/3/2021		GEO ENVIRONMENTAL REPORT - PART 1B
8/3/2021		GEO ENVIRONMENTAL REPORT - PART 2
8/3/2021		GEO ENVIRONMENTAL REPORT - PART 3
8/3/2021		GEO ENVIRONMENTAL REPORT - PART 4
8/3/2021	65-04 REV P6	ROAD WIDENING SECTIONS
8/3/2021	65-03 REV P16	ROAD WIDENING REPAIRS
8/3/2021	05-885-700 REV H	LANDSCAPE STRATEGY

8/3/2021	55-01 REV P17	PROPOSED DRAINAGE LAYOUT
8/3/2021		RIPARIAN MAMMAL SURVEY
8/3/2021		BAT SURVEY
8/3/2021		PRELIMINARY ECOLOGICAL APPRAISAL - 1
8/3/2021		PRELIMINARY ECOLOGICAL APPRAISAL - 2
8/3/2021		LANDSCAPE & VISUAL APPRAISAL REPORT - PART 1
8/3/2021		LANDSCAPE & VISUAL APPRAISAL REPORT - PART 2
8/3/2021		UTILITY SERVICES REPORT
8/3/2021		DQRA SUMMARY REPORT
8/3/2021		1 IN 100 YEAR + 40CC UPDATE APT PAVING
8/3/2021		ENERGY STATEMENT
8/3/2021		PILING METHOD STATEMENT & RISK ASSESSMENT
8/3/2021		FRAMEWORK TRAVEL PLAN
8/3/2021		TRANSPORT ASSESSMENT
8/3/2021		CONSTRUCTION LOGISTICS MANAGEMENT PLAN
8/3/2021		FLOOD RISK ASSESSMENT & DRAINAGE STRATEGY
8/3/2021		TREE SURVEY & AIA
8/3/2021		GEO ENVIRONMENTAL REPORT - PART 4A
8/3/2021		GEO ENVIRONMENTAL REPORT - PART 4B
8/3/2021		SUPPLEMENTARY SITE INVESTIGATION - 3A
8/3/2021		SUPPLEMENTARY SITE INVESTIGATION - 3B
8/3/2021		SUPPLEMENTARY SITE INVESTIGATION - 3C
30/3/2021	17019-C4P-AV-00-DR-A-0500_P17	AMENDED SITE PLAN
30/3/2021	REV 2	AMENDED PLANNING STATEMENT
23/4/2021	19/0333/R2	AMENDED NOISE ASSESSMENT
23/4/2021	REV 4	AMENDED AIR QUALITY ASSESSMENT
12/5/2021	REV V02	TRANSPORT - TECHNICAL NOTE

1/7/2021		HYDROLOGICAL IMPACT ASSESSMENT AND GQRA REPORT
1/7/2021		LETTER FROM TIER CONSULT LTD
7/7/2021	19/0333/M02 REV 1	NOISE RESPONSE
7/7/2021		NVC SURVEY
7/7/2021		NVC SPECIES LIST
21/10/2021		Committee Report (this includes all consultee responses in full);