

Appendix 3: Flood Risk Assessment

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Plate 1. Aerial view of proposed infill site.

Consequently, Hydrec Environmental Consulting was engaged by Elaine Gibson, Senior Environmental Consultant at Rowan Engineering Consultants on behalf of the applicant to complete a Site-Specific Flood Risk Assessment. This document contains the details of said assessment and is structured in the following format:

- Section 2 outlines the planning and flood risk guidelines adhered to;
- Section 3 describes the site setting and existing environment;
- Sections 4 – 6 works through a staged approach to the flood risk assessment;
- Section 7 describes the outcome of the detailed flood risk assessment / hydraulic modelling outputs;
- Section 8 describes the mitigation measures described for the project;
- Section 9 assesses the requirement for a justification test; and
- Section 10 concludes on the findings of the assessment.

- **Flood Zone B** – where the probability of flooding from rivers and the sea is moderate (between 0.1% or 1 in 1000 and 1% or 1 in 100 for river flooding and between 0.1% or 1 in 1000 year and 0.5% or 1 in 200 for coastal flooding); and
- **Flood Zone C** – where the probability of flooding from rivers and the sea is low (less than 0.1% or 1 in 1000 for both river and coastal flooding). Flood Zone C covers all areas of the plan which are not in zones A or B.

3.0 SITE DESCRIPTION & EXISTING ENVIRONMENT

3.1 Site Description & Proposed Development

It is understood that Coffey Construction Ltd. have applied to South Dublin County Council for planning permission to recontour / infill lands at a site at Slade, Saggart, Co. Dublin. It is also understood that this infill material will consist of inert soil, subsoil and stone excavated from an adjoining site where they are constructing a new 100,000m³ covered reservoir of approximately 31,520m² in area with a height of c.6.7m for Irish Water. In total a volume of 35,000m³ of material with an average fill level of c.3.5m above existing ground level is proposed. A minimum buffer distance of 10m from the Camac Stream is proposed across the site. Additionally, the applicant's have not scheduled any infilling of lands below an elevation of 135.81m in an effort to avoid the infilling of any Flood Zone A areas. It is understood that after all infill has been deposited onsite, the site will be reseeded and returned to agricultural use.

3.2 Hydrology

With the publication of Ireland's second River Basin Management Plan (RBMP), the RBMP 2018 – 2021 defines the entirety of the island of Ireland as a single River Basin District (RBD). This single RBD has been broken down into 46 catchment management units. These units are mainly based on the hydrometric areas in use by the local authorities. Each of the 46 catchment management units have been further broken down into 583 sub-catchments. The proposed development site is located within the Liffey & Dublin Bay Hydrometric Area (No.09) and WFD Catchment (No.09). Additionally, the site is located within the Liffey_SC_090 WFD Sub-catchment.

The Camac stream (2nd Order) which runs adjacent to the eastern / south-eastern boundary of the proposed infill site is the closest watercourse to the site (see Figure 1 & Plate 2). This waterbody flows in a general southern to northern orientation, whereby it is culverted under the L6018 – Local Road. From there it passes / diverted through the Millbrook Manor Nursing

Home and afterwards merges with the Crockshane Stream c. 600m downstream. In total, the contributing upstream catchment from the site equates to an area of 5.821km².



Plate 2. View of the Camac stream, bordering the proposed development site and facing in a northern direction.

3.3 Geology

According to the Teagasc and EPA soils map, three different soil types are mapped to occur within the site. AminDW – Deep well drained (Mainly acidic) soil belonging to the Acid Brown Earths / Brown Podzolics soil group exists within the ground at a higher elevation in the northern portion of the site. BminSW – Shallow well drained (mainly basic) soil is mapped to occur as band across the centre of the site. Whilst, AlluvMin – mineral alluvium soils are found on the periphery of the Camac Stream.

In Ireland, the parent material underlying the majority of the country is comprised of quaternary sediments with the remainder composed of bedrock outcrop. These quaternary sediments have resulted from glacial movement, melting and deposition. Similarly, the Teagasc and EPA subsoil maps identify that there are three different subsoil types present (see Figure 2). Where AminDW is found, TLPSsS – Sandstone and shale till of predominantly

clayey texture is present. GLs – Glaciofluvial sands & gravels are found to underly the AminSW soils, whilst undifferentiated alluvium subsoils are found in the vicinity of the Camac River. Correspondingly, three differing groundwater subsoil permeability classifications are found within the confines of the site. The alluvium subsoil is categorised as being of 'Low' permeability, the sandstone and shale till is categorised as being of 'Moderate' permeability, whilst the glaciofluvial sands and gravels mapped across the centre of the site are defined as being of 'High' permeability (see Figure 2).

Based on the GSI's 1:100k bedrock formation mapping, the majority of the site is underlain by the Pollaphuca Formation which comprises of medium grey, coarse, graded greywackes and dark grey shales. No bedrock outcrops are present within the boundaries of the site, with the closest outcrop identified approx. 1km to the north. According to The National Karst Database, no karst landforms are identified within or in close proximity the site.

potentially significant. The Eastern CFRAM Study Area covers approximately 6,250 km² and includes four Units of Management (UoM); Hydrometric Area (HA) 07 (Boyne), HA08 (Nanny – Delvin), UoM09 (Liffey/Dublin Bay) and HA10 (Avoca-Vartry). The Eastern CFRAM Flood Risk Review highlighted the Camac catchment as an Area for Further Assessment and a High Priority Watercourse based on a review of historic flooding and the extents of flood risk determined during the PFRA. The stretch of the Camac Stream bordering the applicant's site, is included within the Camac Hydraulic Model – Upper Catchment. As can be seen from the Camac Model flood extent mapping (see Plate 4), flooding under the 1 in 100-year scenario is predicted to occur within parts of the proposed infill site.

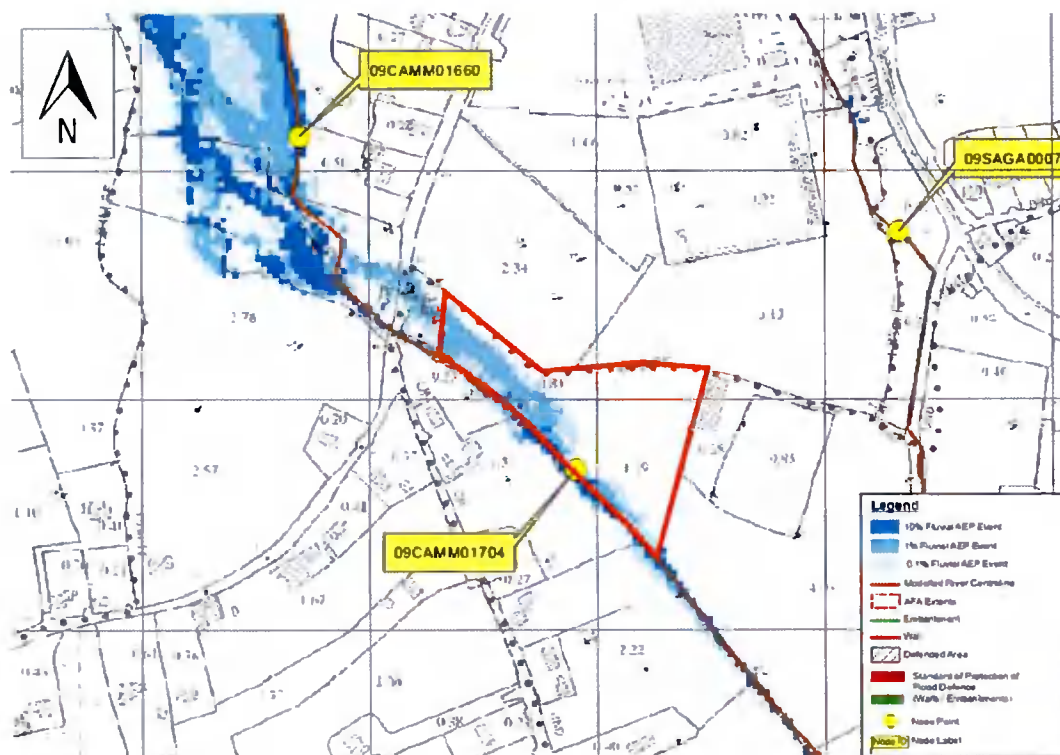


Plate 4. Extract from the Eastern CFRAM flood mapping showing the 10%, 1% and 0.1% fluvial flood extents based on current day scenario (i.e. site boundary outlined by red poly-line).

4.1.3 Fluvial Flooding – National Indicative Flood Mapping (NIFM)

The National Indicative Fluvial Maps (NIFM) is a project which was finalised in December 2020 which provides an indication of areas that may flood during a flood of an estimated probability of occurring. These indicative fluvial flood maps were developed using hydrodynamic modelling, based on calculated design river flows, Digital Terrain Models, and other relevant datasets (e.g. land use, data on past floods, etc.) for all subject watercourses with an upstream catchment area of greater than 5 km². It should be noted that the NIFM are not as accurate as the Flood Maps produced under the CFRAM Programme but could be regarded as advance

4.1.6 Coastal Flooding

Coastal flooding is caused by higher sea levels than normal, largely as a result of storm surges, resulting in the sea overflowing onto land. The development site is located approx. 19km from the coast and therefore coastal flooding is not deemed to be an issue at the site.

4.2 Stage 1 Conclusion

Pluvial and coastal flooding are not anticipated to occur onsite and therefore no further assessment in terms of risk from either is required. According to the PFRA and CFRAM mapping, there is the potential for fluvial flooding to occur within the confines of the proposed infill site. It is therefore concluded that the assessment should proceed to Stage 2 (Scoping Stage) and concentrate on the potential fluvial flood risk.

5.0 STAGE 2 ASSESSMENT (SCOPING STAGE) – INITIAL FLOOD RISK ASSESSMENT

As mentioned previously, more detailed hydraulic modelling of the Camac Stream / River was completed as part of the Eastern CFRAM Study. In order to assess the sufficiency of the model in respect to the client's site the following reports have been reviewed:

Eastern CFRAM Study, HA09 Hydraulics Report (Final 09/08/2017); and

Eastern CFRAM Study, HA09 Hydrology Report (Final 29/04/2016).

At each node point published from the model an estimated water level (mAOD) for the 10% AEP Event (1 in 10-year), 1% AEP Event (1 in 100-year) and 0.1% (1 in 1000-year) is predicted. On such node (i.e. Node 09CAMM01704) is located on the Camac Stream adjacent to the proposed infill site (see Plate 4). Under the 1 in 100-year flood event a water level of 135.81m AOD was predicted (see Plate 4). These flood levels represent the current day scenario (i.e. without climate change allowance). On review of the Flood Extents and Flood Depth maps produced for the applicant's site, it was determined that certain portions of the site were classified as 'Flood Zone A'.

It is understood that post infilling, the site will be reseeded and returned to agricultural use. Consequently, the development can be classified as a '*Less Vulnerable Development*' according to Table 3.1 of the 'Guidelines'. As can be seen from Plate 5, '*Less Vulnerable Development*' is appropriate in lands demarcated as Flood Zone B (i.e. 1 in 1000-year event), whilst a Justification Test is required for development with a Flood Zone A (i.e. 1 in 100-year

6.0 STAGE 3 ASSESSMENT – SITE SPECIFIC DETAILED FLOOD RISK ASSESSMENT

6.1 Site Survey

On the 06th of September 2021, Patrick McCabe of Hydrec Environmental Consulting visited the applicant's site and surrounding environs to assess the condition of the watercourse and to select the cross-section locations required to complete the hydraulic modelling aspect of the project. It was noted that the stream bed comprised largely of a gravel / cobble substrate with a degree of substrate siltation evident on the base of the channel. Minimal instream vegetation was observed during the assessment. Two pieces of instream infrastructure were noted, including (see Figure 3 & Plate 6):

- An arched bridge culvert (i.e. 2.135m rise and 3.429m span), located within the channel directly to the north-west of the site (i.e. L6018 – Local Road Culvert); and
- A rectangular box concrete culvert (1.359m rise and 3.843m span), located within channel and within the grounds of the Millbrook Manor Nursing Home.



Plate 6. Photo of L6018 – Local Road Bridge traversing the Camac Stream to the north-east of the site.

LEGEND



Site Boundary



Stream / River



Drainage Channel



PROJECT:

Flood Risk Assessment Report
Coffey Construction Ltd -
Slade, Saggart, Co. Dublin

TITLE:

Hydrological features in the vicinity of
the site

SCALE:

1:8,000@A3

DRAWN BY:

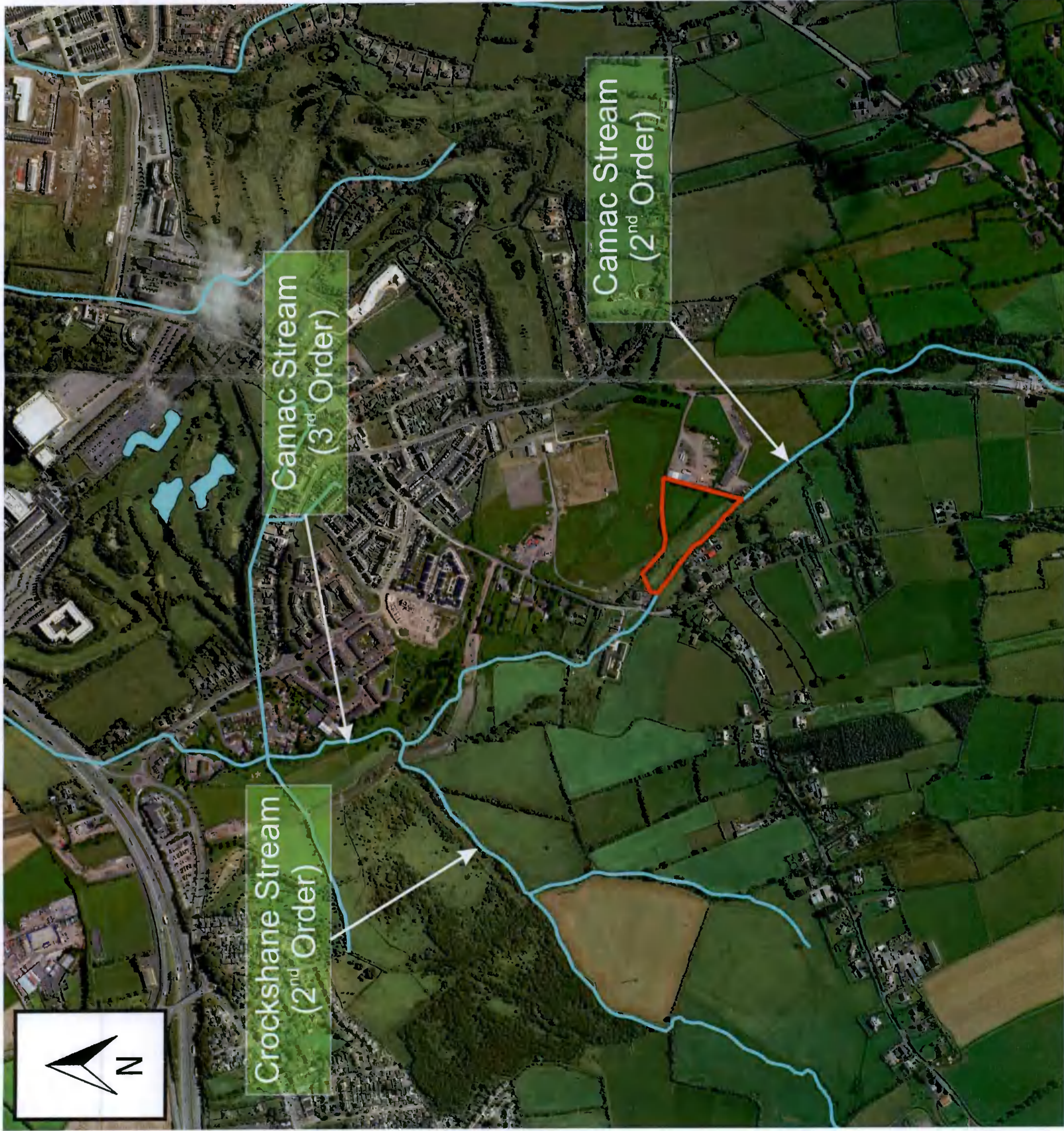
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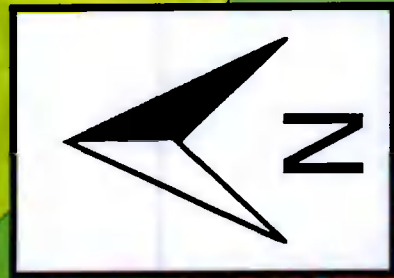
DRAWING NO:

Figure 1.

REV.

0





LEGEND



Site Boundary



A - Alluvium



Gls - Sands & Gravels



TLPSSs - Sandstone & Shale Till



PROJECT:

Flood Risk Assessment -
Coffey Construction Ltd -
Slade, Saggart, Co. Dublin

TITLE:

Teagasc Subsoil Maps of Site & Surrounding
Lands

SCALE:

1:1,250

DRAWN BY:

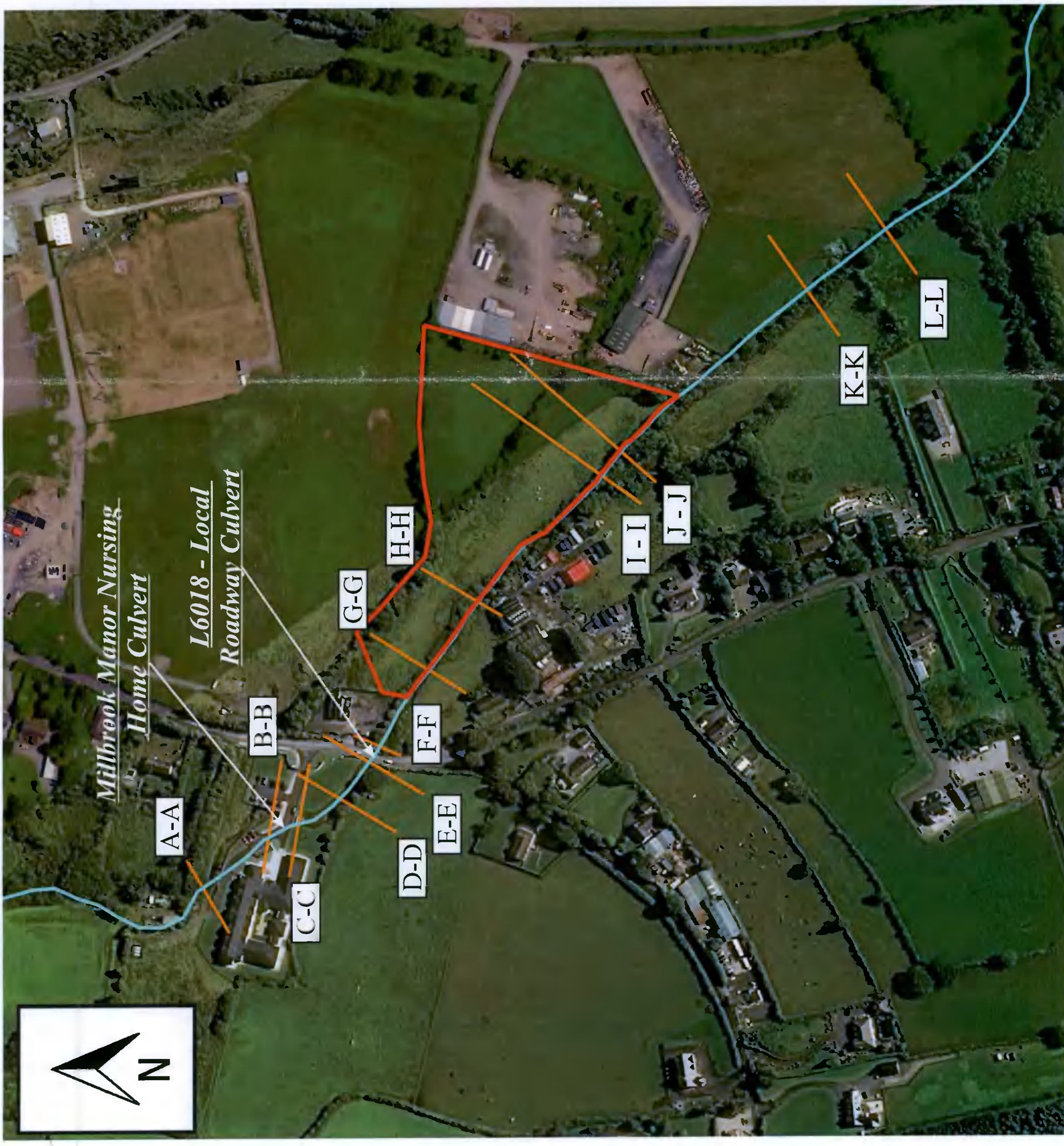
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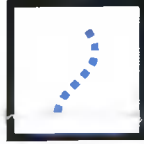
Figure 2

REV.

A



LEGEND

-  Site Boundary
-  Stream / River
-  Cross Section Location
-  Drainage Channel



PROJECT:
 Flood Risk Assessment
 - Coffey Construction Ltd. -
 Slade, Saggart, Co. Dublin

TITLE:
 Topographical cross sections locations used
 within the hydraulic model assessment

| | |
|---------------------------------|--------------------------|
| SCALE: 1:2,500@A3 | DRAWN BY: PMcC |
| DRAWING NO: Figure 3. | REV. 0 |