



Civil Engineers & Transport Planners

The Grange,
Salisbury

Flood Risk
Assessment

April 2022

221510/FRA/MN/RS/01



Civil Engineers & Transport Planners

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1 INTRODUCTION

1.1 Scope

- 1.1.1 Lanmor Consulting has been appointed to prepare a Flood Risk Assessment (FRA) for the proposed development at The Grange, Gaters Lane, Winterbourne Daunstey, Salisbury, Wiltshire, SP4 6ER.

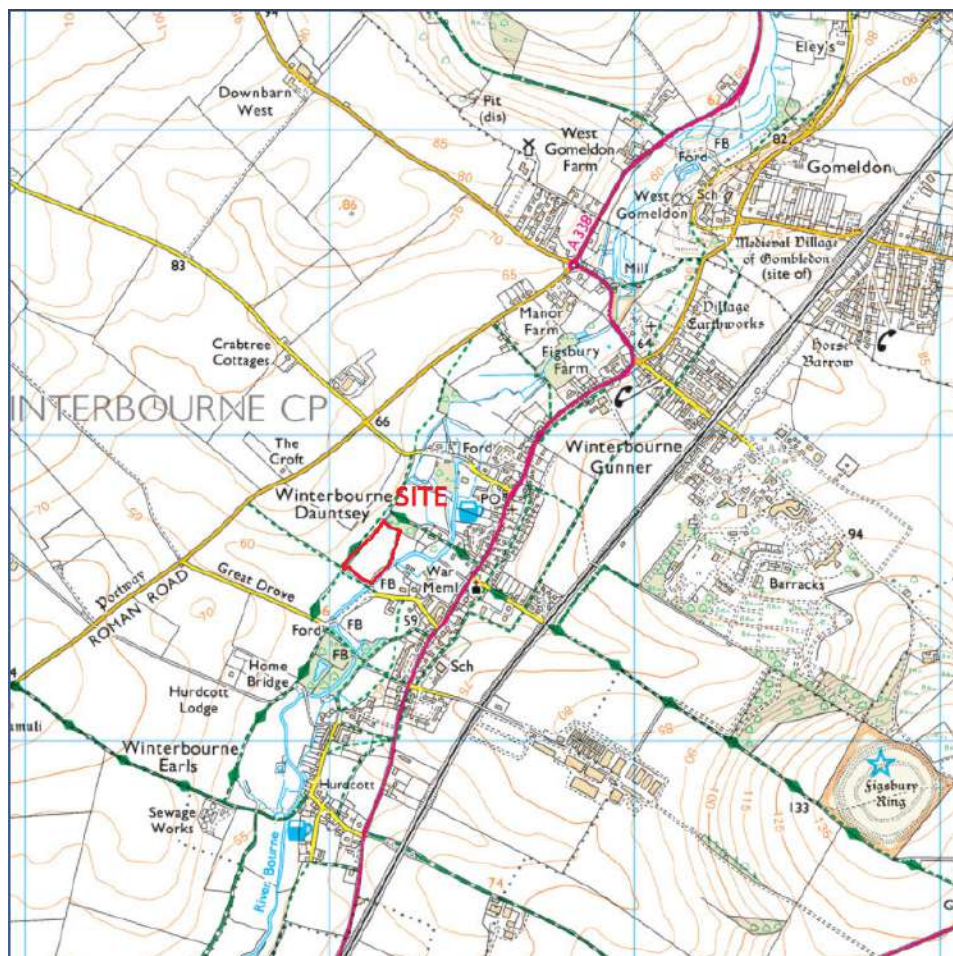


Figure 1.1 – Site Location

- 1.1.2 This report describes the proposed development, the implications of flooding and the impact the development will have on the flood plain in accordance with the governments guidance document; National Planning Policy Framework (NPPF) and its Planning Practise Guidance (PPG).

1.1.3 This report will focus on the following:

- Location of the site;
- Development proposals;
- Existing information on extents and depths of flood events or on flood predictions;
- Sources of flooding;
- Flooding impact on proposed site;
- Safe access and egress from the site;
- An assessment of the likely run-off to be generated at the site

This FRA report has been prepared in accordance with the requirements of the National Planning Policy Framework (NPPF) and will demonstrate that the proposed development will be safe and will not increase the risk of flooding in the surrounding areas.

2 BASELINE PARAMETERS

2.1 Existing Site

- 2.1.1 The application site is located north of Tanners Lane off the A338. The River Bourne borders the site to the south. The site is in a residential area surrounded by greenfield and a cluster of residential units across the A338.

2.2 Existing Geology

- 2.2.1 The British Geological Survey records show that the site sits on a bedrock of Seaford Chalk Formation, consisting of Chalk. This sedimentary bedrock formed approximately between 89.8 and 83.6 million years ago during the Cretaceous period.
- 2.2.2 Superficial deposits of the Alluvium formation have been recorded overlaying the bedrock, consisting of Clay, Sand, and Gravel. These deposits were formed up 11.8 thousand years ago in the Quaternary period.

2.3 Proposed Development

- 2.3.1 The proposed development seeks to build a habitat pond with a small island in the middle. The site has an overall footprint area of 16,460m². The pond itself will encompass an area of 7500m² with a small island of 1050m². Drawing W21-002-006 is included in Appendix A and shows the pond layout.

3 SOURCES OF FLOODING

3.1 Fluvial/Tidal Flooding

3.1.1 Detailed flood information was requested from the Environmental Agency (EA) for the site. The National Planning Policy Framework (NPPF) defines the flood zones as the following:

- Zone 1: 'Low Probability' – This comprises land assessed as having less than 1 in 1000 annual probability of river or sea flooding (<0.1%) in any year.
- Zone 2: 'Medium Probability' – This zone comprises land assessed as having between a 1 in 100 and 1 in 1000 annual probability of river flooding (1% - 0.1%) or between a 1 in 200 and 1 in 1000 annual probability of sea flooding (0.5% - 0.1%) in any year.
- Zone 3a: 'High Probability' – This zone comprises land assessed as having a 1 in 100 or greater annual probability of river flooding ($\geq 1\%$) or a 1 in 200 or greater annual probability of sea flooding ($\geq 0.5\%$) in any year.
- Zone 3b: 'The Functional Floodplain' – This zone comprises of land where water must flow or be stored in times of flood. The SFRAs should identify this Flood Zone (land which would flood with an annual probability of 1 in 20 (5%) or greater in any year or is designed to flood in an extreme (0.1%) flood, or at another probability to be agreed between the LPA and the EA) including water conveyance routes.

3.1.2 The most significant source of flooding to the development come from the River Bourne sitting directly on the south of the site boundary. The EA flood mapping indicates that application site lies within Flood Zones 2 and 3. Figure 3.1 below shows the location of the site and its relationship to the flood zones in the area.

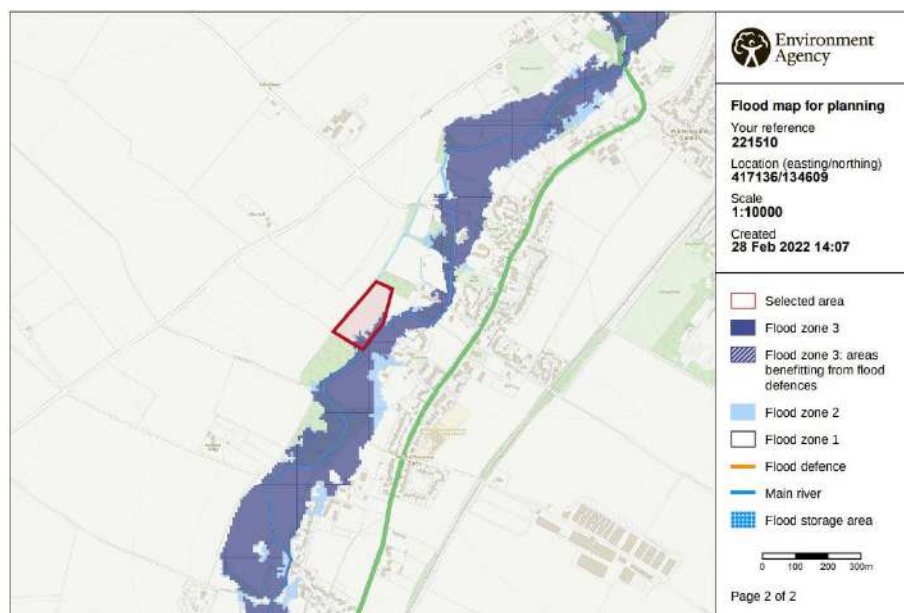


Figure 3.1 – EA Flood Map

3.1.3 The dark blue shaded areas indicate the extent of Flood Zone 3, the light blue Flood Zone 2 and the unshaded area indicates Flood Zone 1. The information provided by the EA shows the site is located within Flood Zone 2. It therefore has a 1 in 100 or greater annual probability of river flooding ($\geq 1\%$).

3.2 Surface Water Flooding

3.2.1 The surface water flood mapping provided by the EA is the best available source of national information on surface water flooding. It is a starting point for understanding patterns and probability of surface water flooding. The EA accept that the mapping has limitations and state that *'these maps cannot definitively show that an area of land or property is, or is not, at risk of flooding, and the maps are not suitable for use at an individual property level'*.

3.2.2 The application site is indicated as having a very low risk of surface water flooding, as shown in Figure 3.2 below. The depth of flooding for an event with a 1 in 100 year probability is indicated in Figure 3.2. The application site and the access route to the site is not indicated to be at risk from surface water flooding.

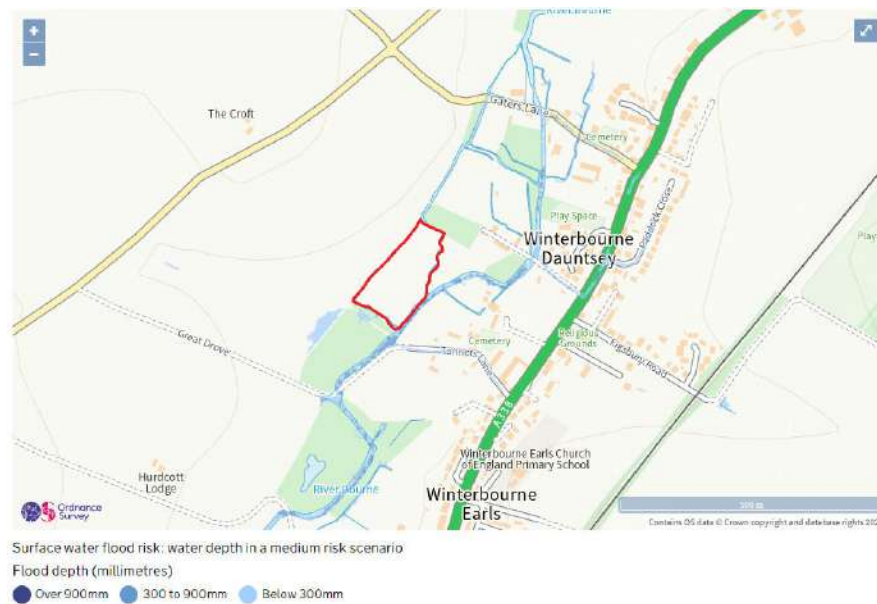


Figure 3.2 – EA Surface Water Map

3.3 Groundwater Flooding

3.3.1 Wiltshire Council has assessed the susceptibility of groundwater flooding in the borough, mapping in the SFRA shows the risk of groundwater flooding to be at a medium risk factor. The site is in an area where groundwater levels are between 0.5m and 5m below the ground surface.

3.3.2 The councils SFRA mapping shows the details of the groundwater flood risk to the site and is included in Appendix B.

3.4 Historic Flooding

3.4.1 The councils SFRA data provides the number of incidents and source of flooding events across the borough. The SFRA data shows that the site area has had no past events of flooding sources.

3.4.2 The SFRA table providing historic flooding data can be found in Appendix B.

4 MODELLED FLOOD EVENTS AND CLIMATE CHANGE

4.1 Flood Probability

4.1.1 The main source of flooding risk to the site is the River Bourne on the southern boundary of the site. However, most of the site remains within Flood Zone 1 with the southern boundary in Flood Zone 2 and 3 as confirmed by the EA. The probability of fluvial flooding to the site is therefore considered to be between 0.1% and 1%.

4.1.2 Product 4 data from the Environment Agency was requested however detailed fluvial flood risk modelling has not been carried out in the location of the site. It has therefore not been possible to undertake any detailed flood modelling analysis for the site hence an estimate of the 1% AEP flood levels has been used for the benefit of this assessment. The EA flood map extents have been superimposed over the topographical survey of the site to estimate the 1% AEP flood level, this has been assessed as 55.85m AOD. Drawing 221510/FRA/01 is included in Appendix C and outlines the flood extents.

4.2 Climate Change

4.2.1 As mentioned above, it has not been possible to obtain any flood information at this location of the River Bourne and therefore flood levels including allowances for climate change have not been provided.

5 IMPACTS OF FLOODING

5.1 Impact on Flood Waters

5.1.1 The site is partially situated in a Flood Zone 2 and 3 area with a probability of fluvial flooding of greater than 1%. It is also unlikely to be affected by surface water flooding as per the data provided by the EA and the Councils SFRA. It does have a medium susceptibility of groundwater flooding however; historic floods have not indicated any flooding incidents.

5.1.2 The proposals involve the construction of a habitat pond with an embankment. The Flood Zone 3 extent slightly encroaches the pond embankment therefore this may slightly impact the existing flow of flood waters.

5.2 Impact on Storage Volumes

5.2.1 As stated previously, the proposed development is for the construction of a pond with an embankment. The flood waters for a 1% AEP affects a small portion of the pond therefore a flood compensation assessment was completed to ensure a level-for-level volume compensation was provided for any flood water displaced by the proposals. As there is no flood information on flood levels including allowances for climate change, the 0.1% AEP flood level which was estimated at 55.90m AOD and has been used for this assessment. The ground levels have been lowered and adjusted around the embankment to the southeast in such a way that no flood storage will be lost as a result of the proposed development. Drawing 221510/FRA/02-03 enclosed within Appendix C shows the existing and proposed flood storage volumes. The flood storage for each increment is also tabulated on the drawings and shows that over 7m³ of additional storage will be provided for the 0.1% AEP flood level of 55.90m AOD.

5.3 Flood Impact on Development

- 5.3.1 The proposed development is for the erection of a pond and embankment. This assessment has demonstrated that the pond could slightly be affected by a flooding with a probability of 1%. As mentioned, the flood levels have been estimated for the 1% AEP as detailed flood information has not been provided. The proposed levels around the embankment have been designed to cater for the loss of flood storage volumes and should reduce the flood impact on the pond embankment. Drawing 221510/FRA/04 in Appendix C outlines the cut and fill areas and shows where the ground will be lowered to compensate for the loss of flood storage volumes.

6 SEQUENTIAL TEST

- 6.1.1 The proposed development seeks to build a pond with an embankment and a small island in the middle. The development is classified as commercial use which is classified as 'water compatible' according to the National Planning Policy Framework. The aim of a sequential test is *"to demonstrate that there are no reasonable available sites in areas with a lower probability of flooding that would be appropriate to the type of development or land use proposed. A sequential approach should be used in areas known to be at risk from other forms of flooding"*.
- 6.1.2 The proposed development is within Flood Zones 2 and 3 which is at high risk of flooding. However, only a small section of the site is situated in Flood Zones 2 and 3. Additionally, given that the development is water compatible, it is considered safe and that it meets the requirement of the sequential test.
- 6.1.3 Table 6.1 below shows that this type of development within Flood Zone 3 is considered appropriate.

Flood Risk Vulnerability classification (see Table D2)		Essential Infrastructure	Water compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Flood Zone (see Table D.1)	Zone 1	✓	✓	✓	✓	✓
	Zone 2	✓	✓	Exception Test required	✓	✓
	Zone 3a	Exception Test required	✓	✗	Exception Test required	✓
	Zone 3b 'Functional Floodplain'	Exception Test required	✓	✗	✗	✗

Key:

✓ Development is appropriate

✗ Development should not be permitted

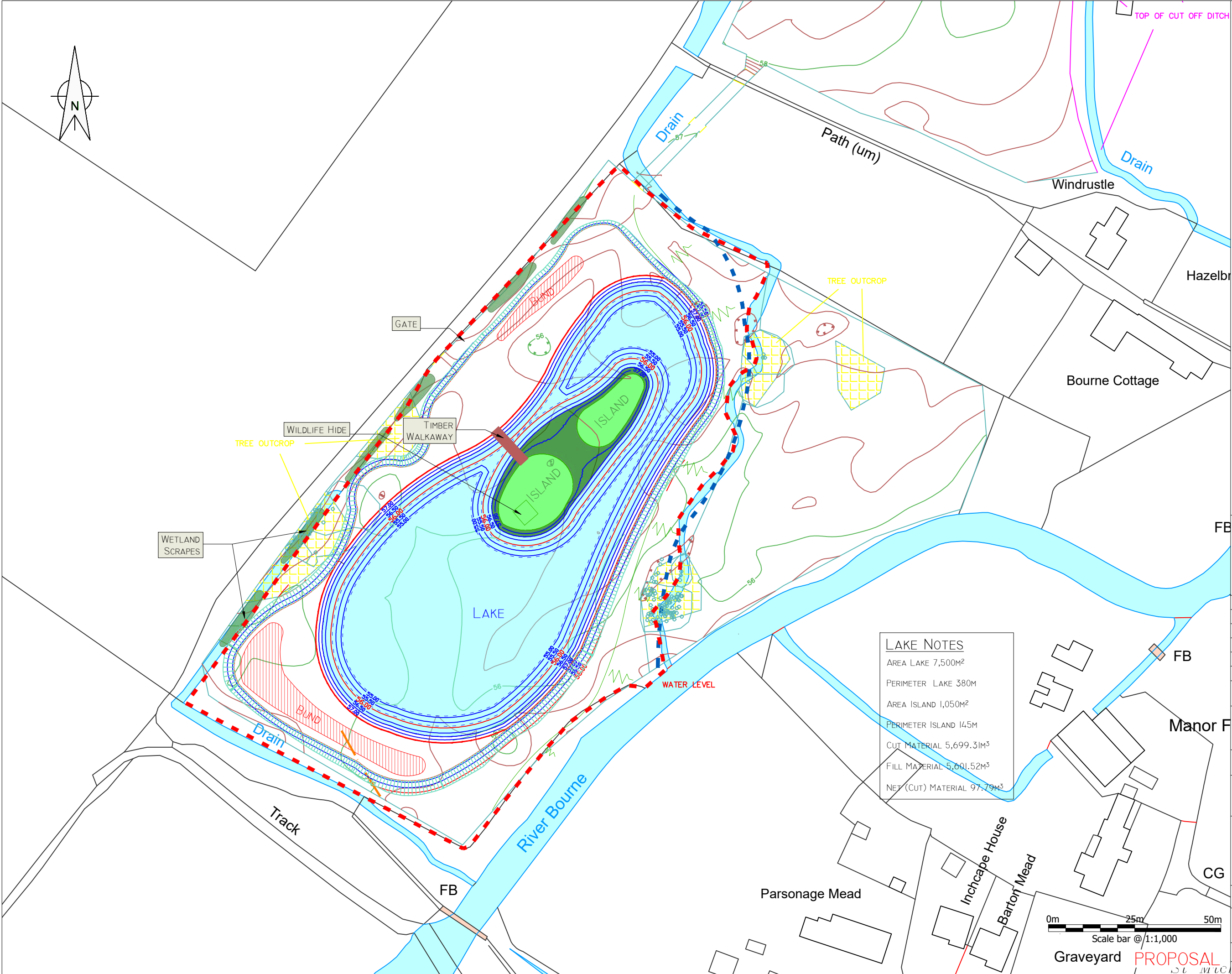
Table 6.1 – Flood Risk Vulnerability and Flood Zone 'Compatibility'

7 SUMMARY

- 7.1.1 The proposed application seeks to build a habitat pond with a small island in the middle. The site has an overall footprint area of 16,460m². The pond itself will encompass an area of 7500m² with a small island of 1050m²
- 7.1.2 The greatest risk of flooding comes from the River Bourne, which is located on the south side of the application boundary. The site is assessed as land having a 1% or greater annual probability of river flooding however the 1% AEP flood extents only affects a small portion of the site. The risk of flooding from other sources to the site is considered to be minimal.
- 7.1.3 Flood compensation will be provided to cater for any loss of flood storage volumes from the development. This has been provided around the embankment to the southeast in areas outside of the 0.1% and 1% AEP extent to ensure a level-for-level volume compensation for any flood water displaced by the proposals.
- 7.1.4 For the reasons set out above, the proposed development is considered suitable for development, as there will be no significant impact on the flood plain, flow paths or flood storage volumes; therefore, we see no reason why the proposal should be refused on the grounds of flooding.

APPENDIX A

Drawing W21-002-006 – Pond Layout



LAKE NOTES
AREA LAKE 7,500M²
PERIMETER LAKE 380M
AREA ISLAND 1,050M²
PERIMETER ISLAND 145M
CUT MATERIAL 5,699.31M³
FILL MATERIAL 5,601.52M³
NET (CUT) MATERIAL 97.79M³

LEGEND

- WATER AREA
- BUND / TIP
- PLANTING
- WETLAND / SCRAPES
- EXISTING WATER COURSE
- OVERHEAD CABLE
- MAXIMUM WATER LINE @56.85M
- TOP OF BANK @57.15M
- TOP OF BUND @58.15M
- IM CONTOUR (PROPOSED)
- 25CM CONTOUR (PROPOSED)
- 1:3 CUT SLOPE
- 1:3 FILL SLOPE

FB NOTES

UNDERLAY: GOOGLE EARTH IMAGERY
ALL MEASUREMENTS APPROXIMATE ONLY. SUBJECT TO CHANGE FOLLOWING FULL SITE SURVEY.

P2	26.08.2021	ISSUED FOR SUBMISSION - JC
P1	04.08.2021	ISSUED FOR SUBMISSION - JC
D4	13.06.2021	ISSUED FOR REVIEW AND COMMENT - JC
D5	31.05.2021	ISSUED FOR REVIEW AND COMMENT - JC
D2	23.05.2021	ISSUED FOR REVIEW AND COMMENT - JC
D1	07.04.2021	ISSUED FOR REVIEW AND COMMENT - JC

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TITLE
HABITAT POND

CLIENT
MR. PAUL MARTIN

SITE
THE GRANGE, GATERS LANE
WINTERBOURNE GUNNER, SALISBURY
WILTS, SP4 6ER

WHITE HORSE
CONTRACTORS

THE SLATTER GROUP

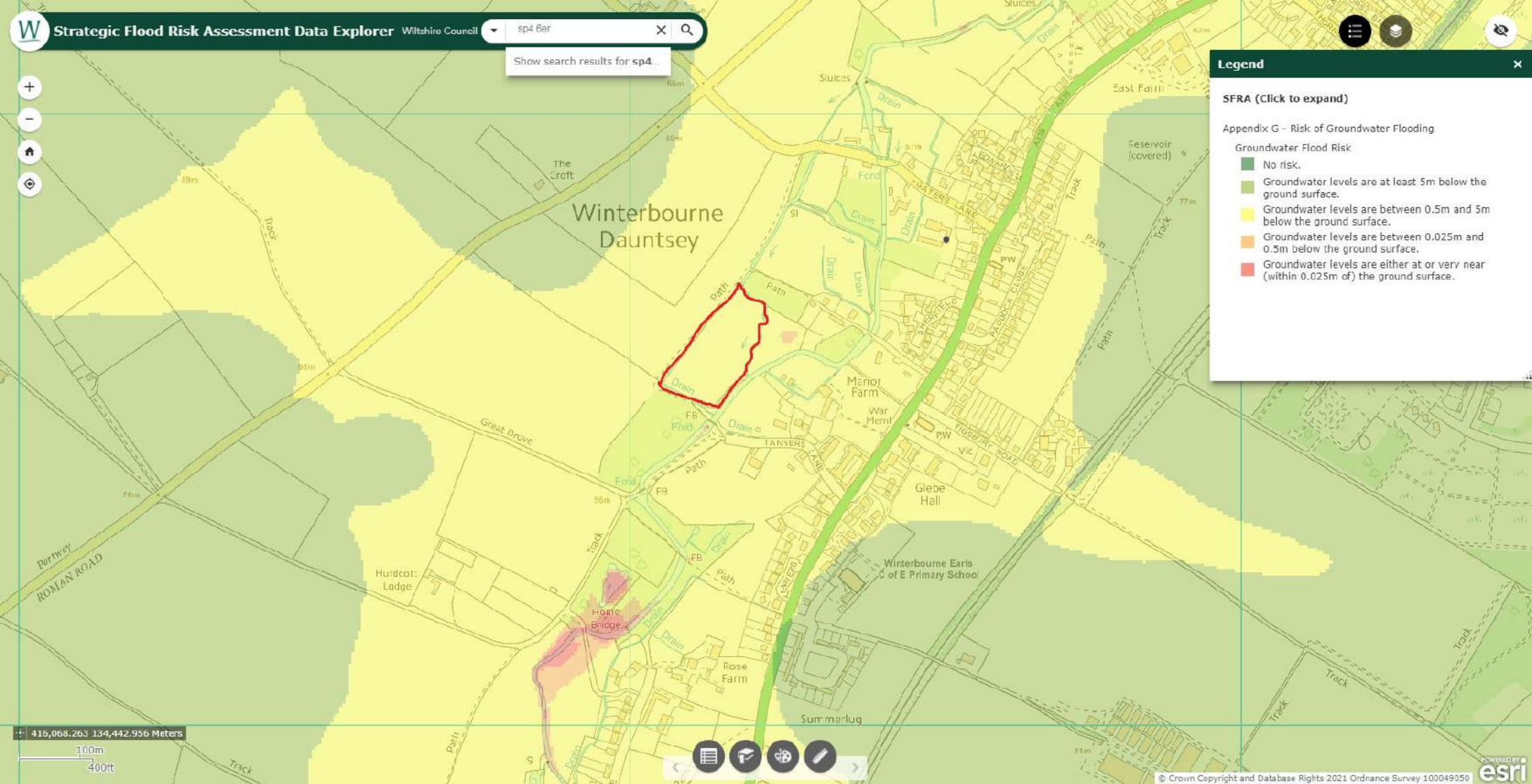
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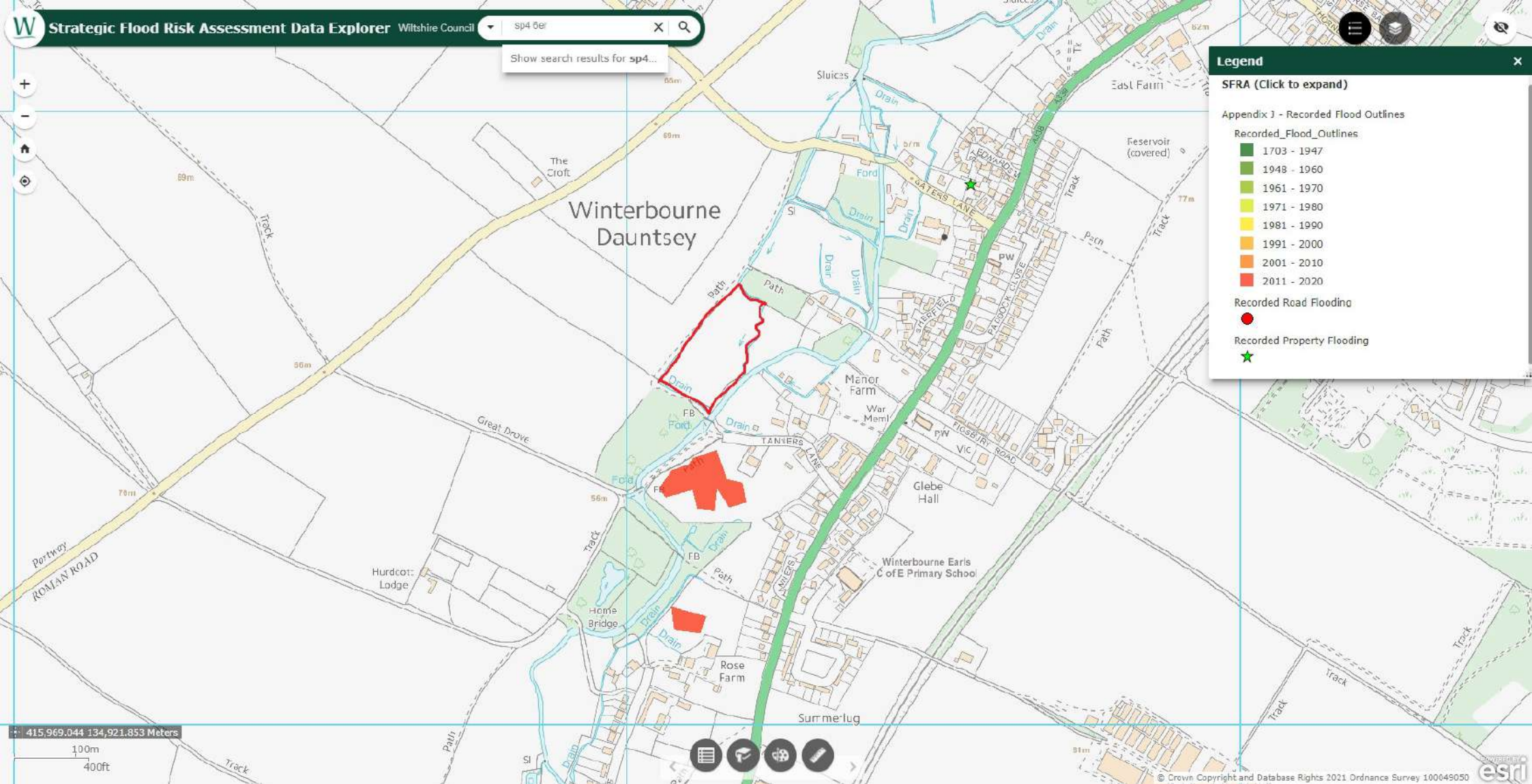
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APPENDIX B

SFRA Figure – Groundwater Flood Map



SFRA Figure – Historical Flood Map

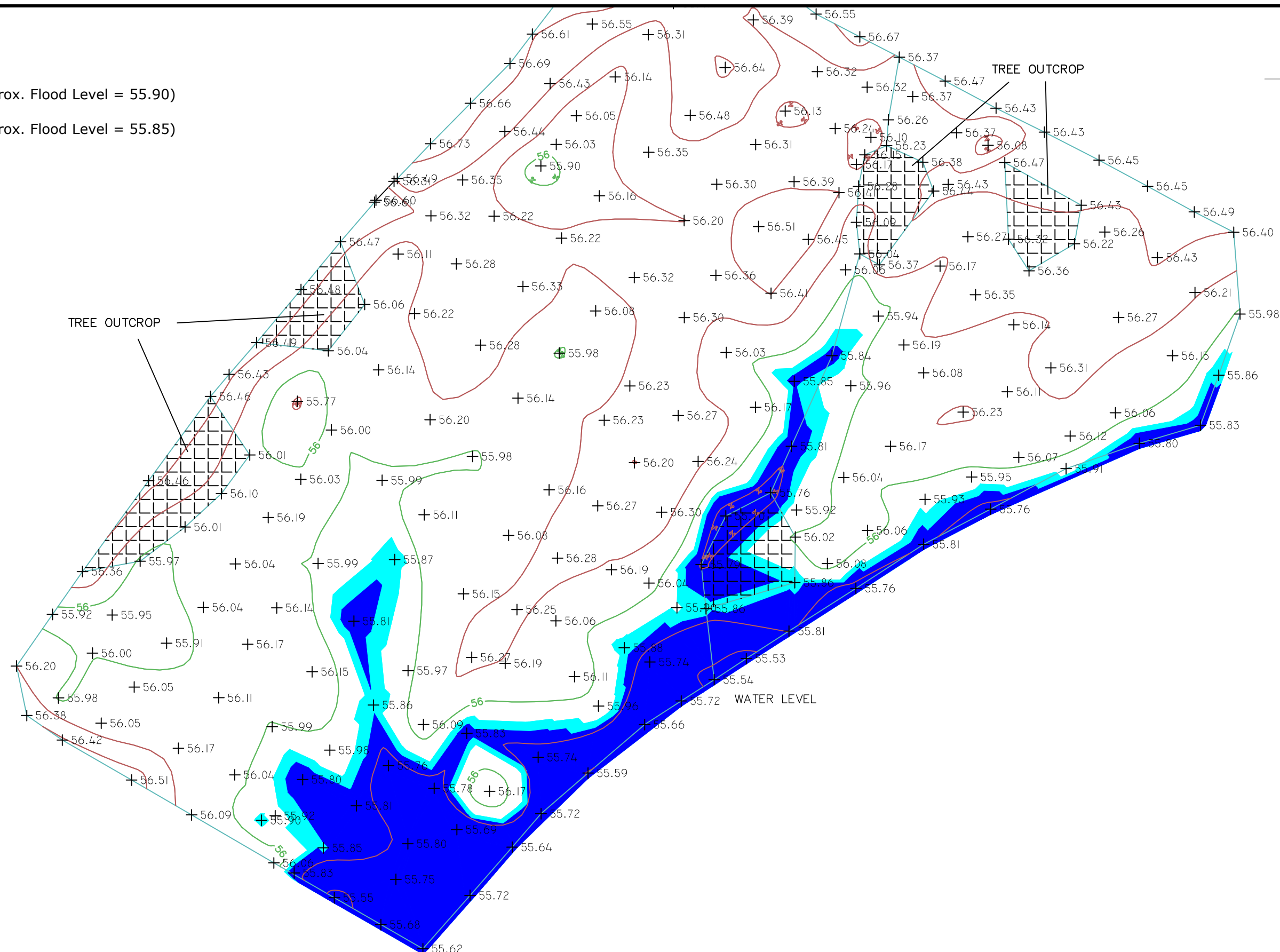


APPENDIX C

Drawing 221510/FRA/01 – Flood Exents Map

Key:

-  Flood Zone 2 (Approx. Flood Level = 55.90)
-  Flood Zone 3 (Approx. Flood Level = 55.85)



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Flood Extents Map

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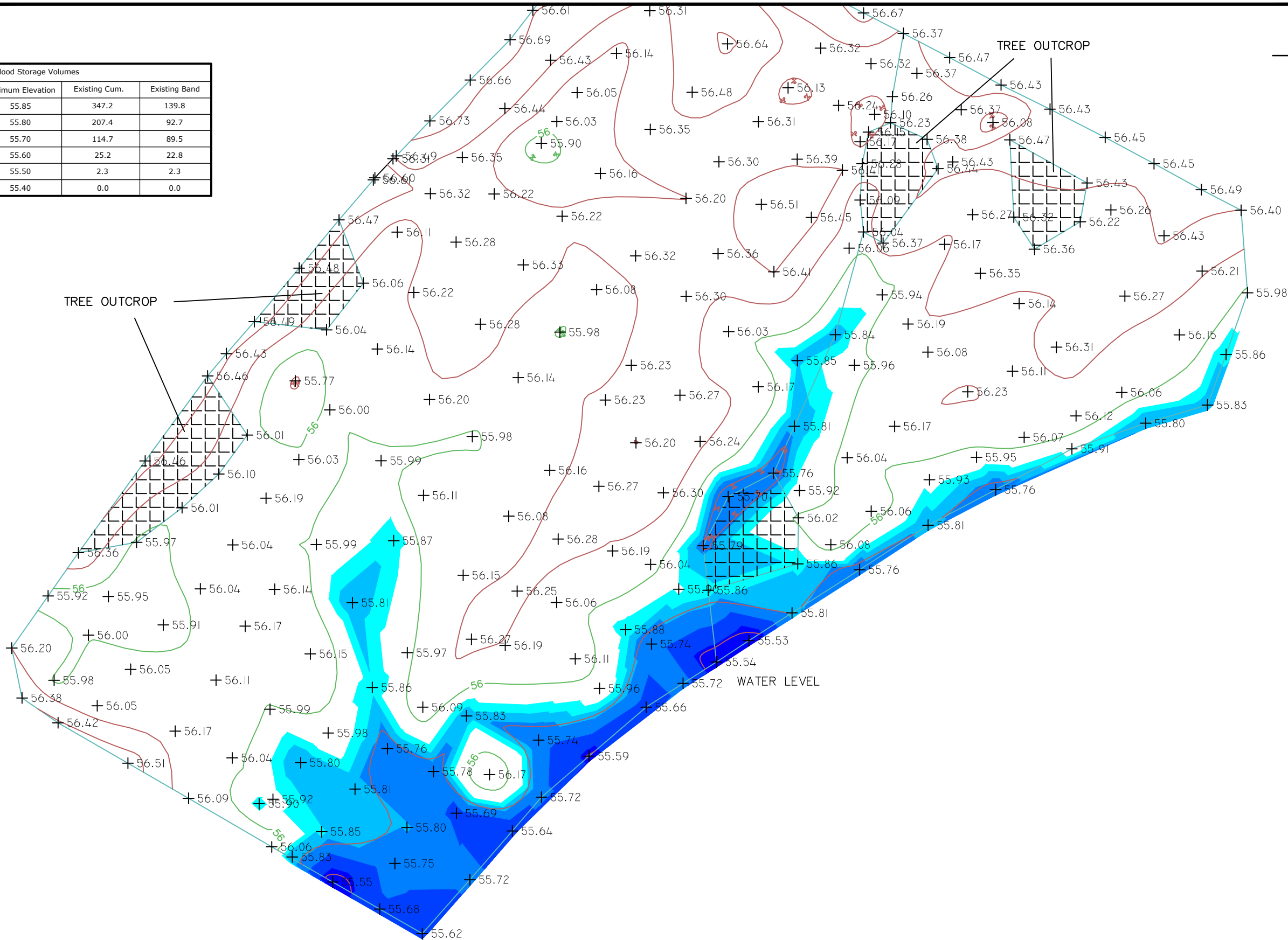
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PRJ No. 221510

DWG No. 221510/FRA/01

Drawing 221510/FRA/02 – Existing Flood Storage Volumes

Existing Flood Storage Volumes					
Band	Color	Minimum Elevation	Maximum Elevation	Existing Cum.	Existing Band
1		55.90	55.85	347.2	139.8
2		55.85	55.80	207.4	92.7
3		55.80	55.70	114.7	89.5
4		55.70	55.60	25.2	22.8
5		55.60	55.50	2.3	2.3
6		55.50	55.40	0.0	0.0



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Existing Flood Storage Volumes



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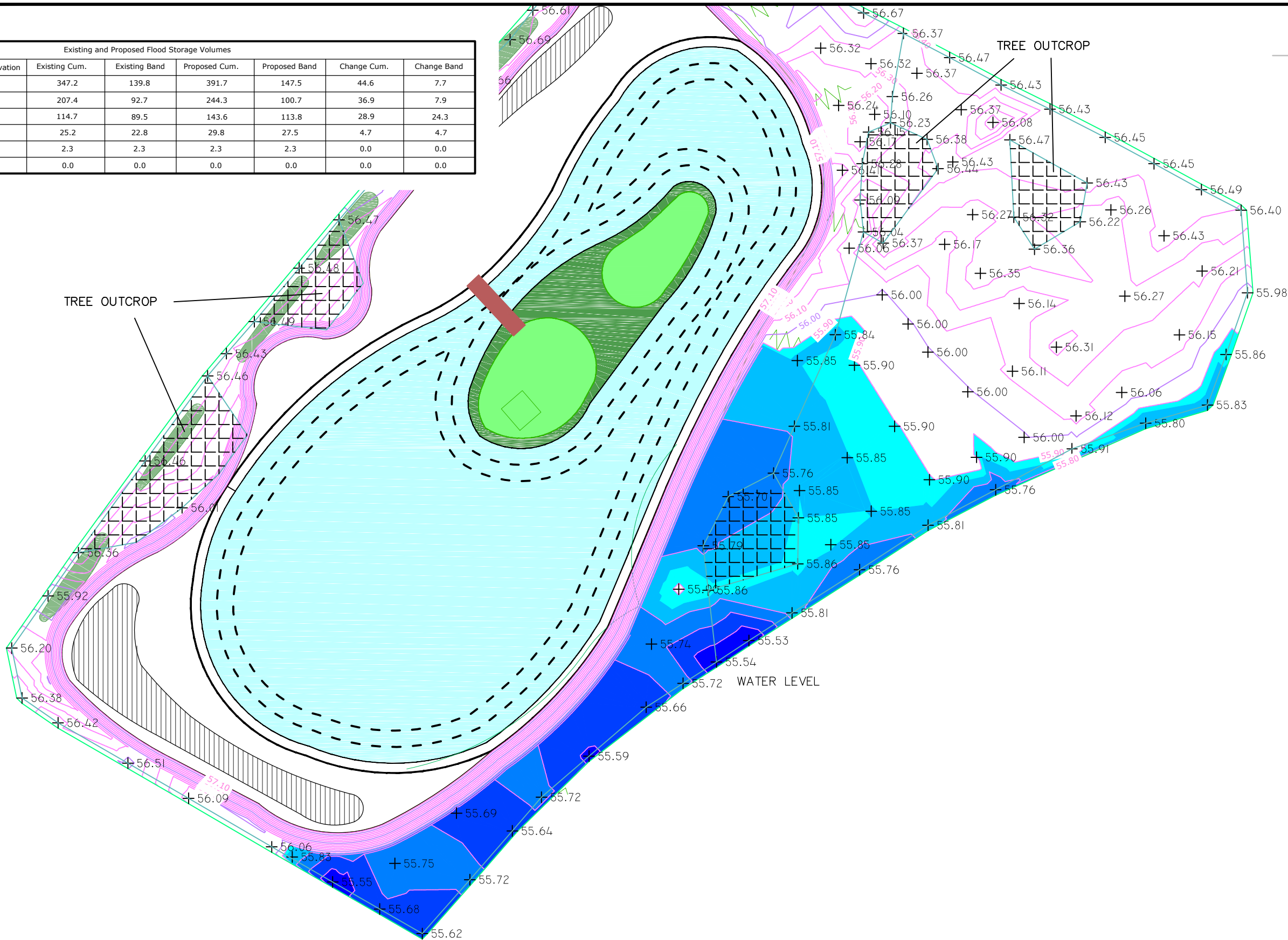
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DWG No. 221510/FRA/02

Drawing 221510/FRA/03 – Proposed Flood Storage Volumes

Existing and Proposed Flood Storage Volumes									
Band	Color	Minimum Elevation	Maximum Elevation	Existing Cum.	Existing Band	Proposed Cum.	Proposed Band	Change Cum.	Change Band
1		55.90	55.85	347.2		391.7	147.5	44.6	7.7
2		55.85	55.80	207.4		244.3	100.7	36.9	7.9
3		55.80	55.70	114.7		143.6	113.8	28.9	24.3
4		55.70	55.60	25.2		29.8	27.5	4.7	4.7
5		55.60	55.50	2.3		2.3	2.3	0.0	0.0
6		55.50	55.40	0.0		0.0	0.0	0.0	0.0



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Proposed Flood Storage Volumes



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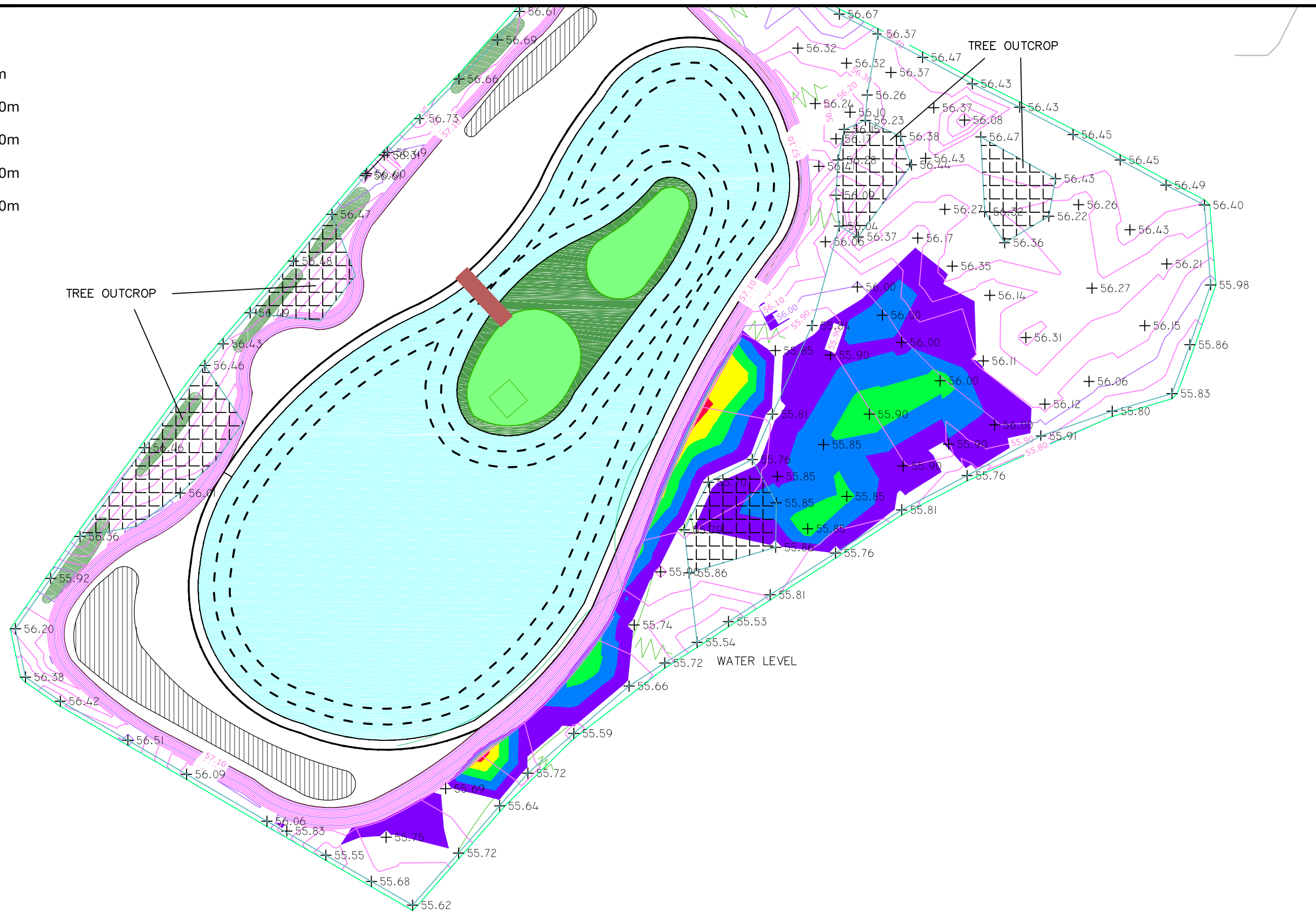
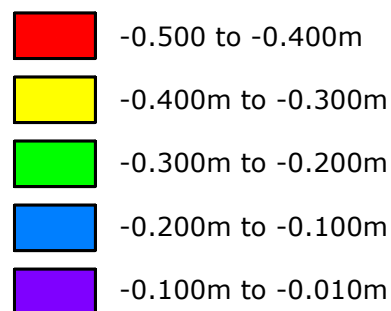
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Drawing 221510/FRA/04 – Cut & Fill

KEY:



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Cut & Fill

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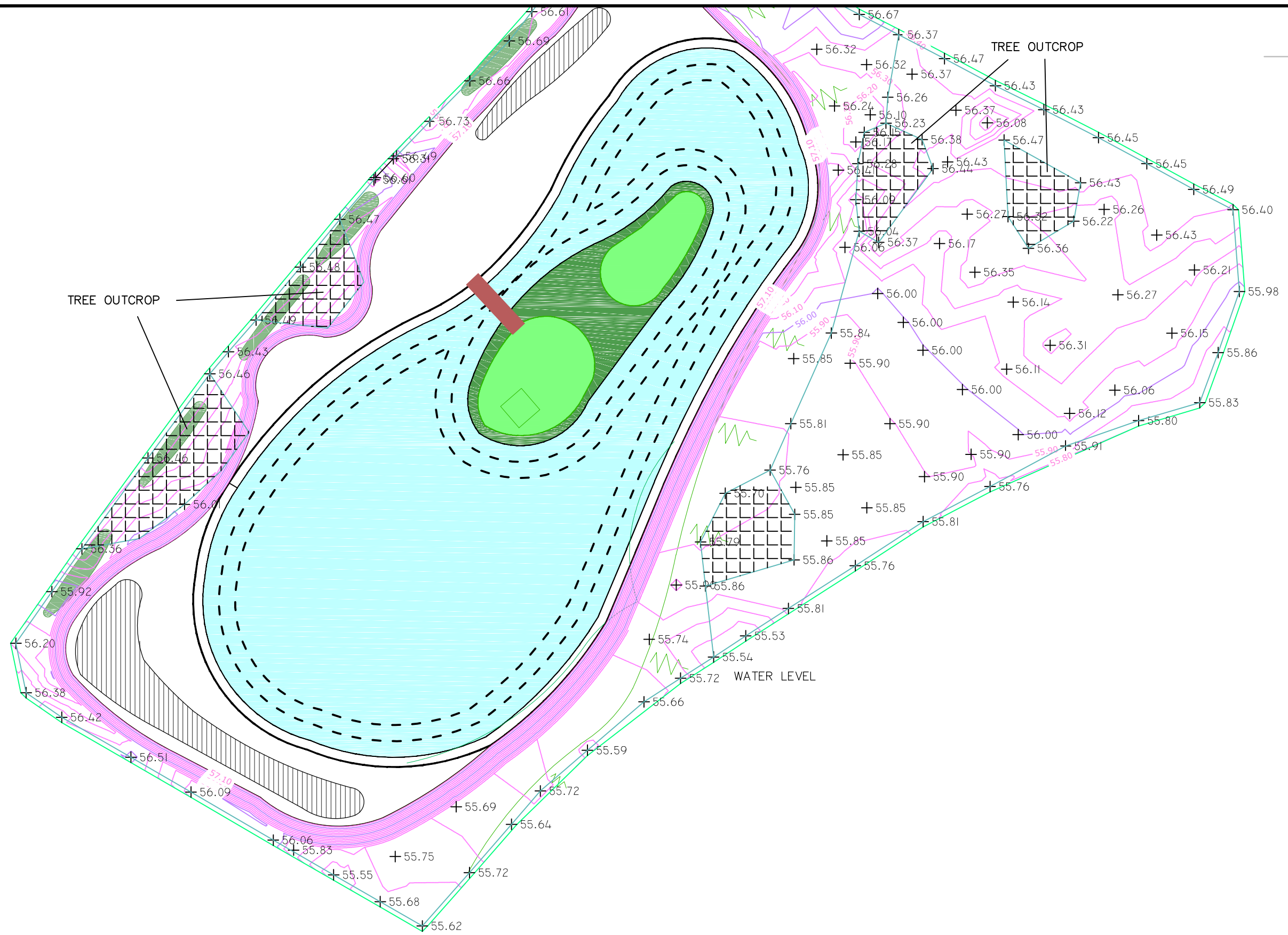
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Drawing 221510/FRA/05 – Proposed Surface



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Proposed Surface



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