

Project No: 2024.066

Project: Proposed Glamping Pods
Leisure Lakes
The Gravel
Mere Brow
PR4 6JX

Subject: Flood Risk Assessment and Drainage Strategy
for Planning Purposes

Date: April 2024



**GRAHAM SCHOFIELD
ASSOCIATES**

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1.0 INTRODUCTION

1.1 Scope of Project

It is proposed to construct 7 no. 'glamping pods' to provide short stay tourism accommodation on an existing lake island. The site is located within the Leisure Lakes complex on The Gravel, Mere Brow, PR4 6JX. To accompany a Planning Application, a Flood Risk Assessment and Drainage Strategy is required.

1.2 Sources of Information

In February 2019, the National Policy for Technical Requirements for Drainage were reinforced as part of the Planning Policy 25 to reflect flooding problems which several parts of the country had experienced in recent years leading up to the introduction of the new legislation.

In general terms, sites in excess of 1.0 Ha in area or within known areas of risk of flooding require both a Flood Risk Assessment and an appropriate drainage strategy.

The proposed development site is less than 1.0 Ha (0.0.15 Ha approx.) and lies within Flood Zone 1 of the Environment Agencies Flood Zone maps, therefore a Flood Risk Assessment is not necessary.

A Drainage Strategy will therefore be carried out using the following information:

- Site Surveying Services: S23747-DR01 Rev A Topographical Survey- **Appendix 'A'**
- CCTV Drainage Survey by Drain Alert – **Appendix 'B'**
- UK flood maps for planning

Directors: I.Schofield BSc (Hons) MSc, C Eng, MI Struct E ❖ M.O'Sullivan MSc, I Eng, IMI Struct E. AMICE
Consultant: G. Schofield C Eng, MI Struct E, MICE, MIEI

1.3 Policy Content

A high level assessment has concluded the site to be of low risk. However, in accordance with “Technical Guidance to the National Planning Policy Framework” the application of a sustainable drainage system shall be adopted to reduce the overall level of flood risk in the area and beyond.

The area of the existing site was in the main permeable with large sections of the proposed development to remain so. Despite being permeable it is anticipated that the existing surface water from the island drainage directly into the lake and as such it is proposed to retain this method of drainage the island.

2.0 EXISTING SITE DESCRIPTION AND LOCATION

2.1 Site Description

- 2.1.1 The site is located within the Leisure Lakes complex on The Gravel, Mere Brow, PR4 6JX.
- 2.1.2 The proposed development site is bound on all sides by a lake. To the East and South the lake extends a considerable distance whilst to the remaining sides the ‘mainland’ is generally within 15m.
- 2.1.3 The development comprises the construction of 7 no. glamping pods that will provide tourist accommodation. It should be noted that some elements of the accommodation are to be formed using a barge, or similar, that will be located adjacent the island and on the water.
- 2.1.4 The proposed site development area is approximately 0.150 Hectares and lies within Flood Zone 1.

2.2 Topography

- 2.2.1 From inspection of the topographic survey it can be seen that the island has a crown with central levels of approximately 3.35m before the slopes in all directions fall to a perimeter water level of approximately 2.5m.
- 2.2.2 Across the access bridge the existing levels remain relatively constant varying from 3.20m to 3.47m.

2.3 Hydrological Setting

- 2.3.1 Ordnance survey mapping indicates the whole Leisure Lakes site, and surrounding areas, are made up of numerous lakes, ponds, ditches and various other waterways.
- 2.3.2 Mere Brow, and the surrounding areas, are all low lying and the existing network of waterways and/or waterbodies are generally interconnected to ensure that surface water is managed as far as is possible.

2.4 Geology and Hydrogeology

- 2.4.1 A historical borehole log from with the Leisure Lakes site indicates that the area is underlain with a soft clay that becomes stiffer with depth down to a level of at least 5m.
- 2.4.2 Percolation tests were deemed unnecessary for the site given the known ground conditions and the location of the development site, i.e. a small island in the middle of a lake.

3.0 FLOOD RISK

- 3.1 The Environment Agency Flood maps indicate the site to be located entirely within Flood Zone 1, land assessed as having less than a 1 in 1000 annual probability of river or sea flooding i.e. 0.1% Annual Exceedance Probability, in any one year.
- 3.2 It should be noted that areas adjacent to the site are within Flood Zone 2 areas although the land at the opposite end of the access bridge is also in a Flood Zone 1 area.

4.0 SURFACE WATER MANAGEMENT

- 4.1 The proposal is to maintain the existing method of surface water ‘management’ for the island that involves overland flows into the lake. The clay subgrade and the domed nature of the island suggests that infiltration would have been nominal.
- 4.2 The external levels on the proposed site will largely remain as existing which ensures that overland flow routes are maintained. In most areas the pods will not have any rainwater goods and as such any runoff from these roofs will flow directly into the lake.

5.0 FOUL DRAINAGE

5.1 Existing Arrangements

- 5.1.1 Presently the glamping pods are operating with a hybrid foul water management system.
- 5.1.2 Solid waste is collected on a regular basis from the proprietary composting toilets that are provided in each unit.
- 5.1.3 It would appear that the remainder of the wastewater from each unit is discharged into the adjacent lake. This would be to include discharge flows from the urinals, sinks, showers, and hot tubs provided in each unit.
- 5.1.4 For the wider site, there is an existing pumping station that currently pumps all wastewater from the caravan site and bike store up to the public sewer in ‘The

Gravel'. It is understood that the existing caravan site has been, or is due to be, closed in readiness for a proposed redevelopment of the site.

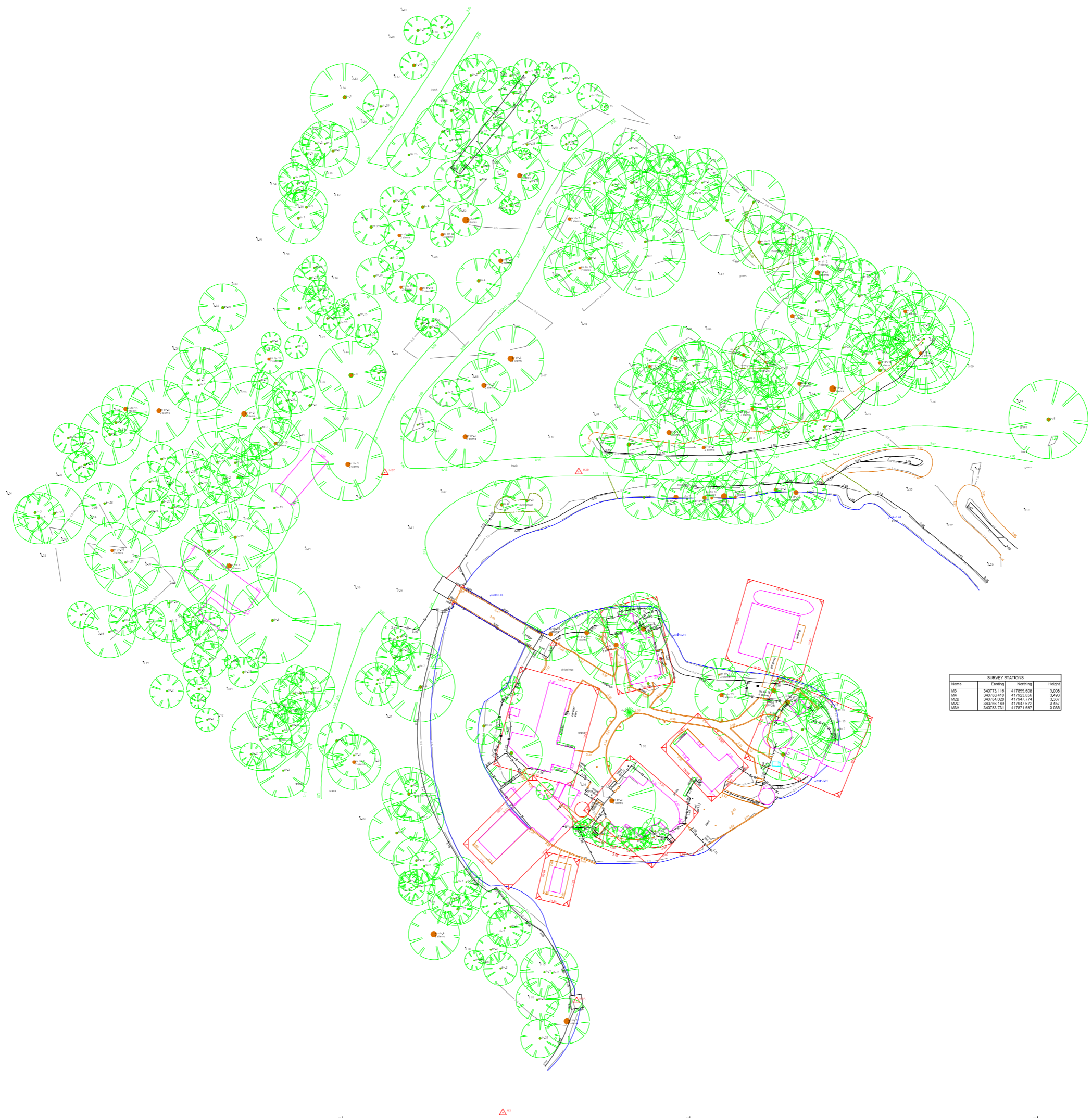
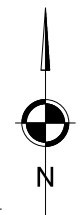
5.2 Proposed Foul Water Management

- 5.2.1 As part of a wider site redevelopment scheme a separate application has been submitted to West Lancashire Borough Council. Planning application reference number 2020/00386/FUL.
- 5.2.2 Within this application it is proposed to provide a new central pumping station to pump all wastewater from the redeveloped site up to the public sewer. This redevelopment scheme currently proposes to provide 386 holiday homes/static caravans across various zones.
- 5.2.3 The provision for glamping pods is not included within the sitewide scheme and as such this Drainage Strategy is concerned only with island development.
- 5.2.4 It is proposed to pump all liquid wastewater off the island before a gravity system will take it off towards the existing Bike Store. Prior to connecting into the existing gravity system there will be a requirement for an additional pump due the distances involved, the low-lying nature of the site, and the existing drain being shallow.
- 5.2.5 Following a CCTV Drainage Survey, it is proposed to provide a new gravity drain from the Bike Store to an existing chamber, some 85m away, that in turn discharges into the existing pumping station. An additional chamber will be added into this length of drain.
- 5.2.6 In the immediate and short-term future, it is anticipated that the existing pumping station will service the glamping pods and bike store with sufficient capacity being available due to the closure of the existing caravan site and relatively small scale of the island development.
- 5.2.7 Similarly, and upon commencement of the sitewide development scheme, it is anticipated that the glamping pods wastewater will connect into the approved foul water drainage scheme with the discharge units being insignificant when considering the approved 386 plots.

Appendix 'A'

Site Surveying Services: S23747-DR01 Rev A – Topographical Survey

Directors: I.Schofield BSc (Hons) MSc, C Eng, MI Struct E ❖ M.O'Sullivan MSc, I Eng, IMI Struct E. AMICE
Consultant: G. Schofield C Eng, MI Struct E, MICE, MIEI



SURVEY STATIONS			
Name	Easting	Northing	Height
M1	340773.110	417809.608	3.028
M2	340780.810	417821.056	3.483
M3	340784.020	417821.774	3.387
M4	340786.549	417847.872	3.487
M5	340788.131	417817.889	3.008

Annotations and Symbols

ac doc	air conditioning box	conc	concrete	concrete ballast
af	air filter	conc wall	concrete wall	concrete wall
af wall	air filter wall	conc wall	concrete wall	concrete wall
af wall	air filter wall	conc wall	concrete wall	concrete wall
af wall	air filter wall	conc wall	concrete wall	concrete wall
af wall	air filter wall	conc wall	concrete wall	concrete wall
af wall	air filter wall	conc wall	concrete wall	concrete wall
af wall	air filter wall	conc wall	concrete wall	concrete wall
af wall	air filter wall	conc wall	concrete wall	concrete wall
af wall	air filter wall	conc wall	concrete wall	concrete wall

Line Features

- bottom of batter / wood / ridge / timber face / gutter
- top of batter
- break line / discontinuity
- wall (see text nearby for height / width / type)
- retaining wall (see text nearby for height / width / type)
- channel (all levels at channel unless noted)
- kerb levels (shown parallel to channel -)
- railway
- drain / river / canal
- overhead lines / buildings (not surveyed unless specified)
- concrete / ramp
- building
- face of cladding / flower bed
- canopy
- verge
- fence (see text nearby for height / width / type)
- columns / grilles / conveyors / column face
- brick
- cycle line / bus lane / white line (see text)
- tanks / decking
- hedge scaled to width

1. The survey has been accurately positioned on the Ordnance Survey National Grid system using GPS observations to the OS Active Network and the latest Ordnance Survey transformation (OSNTS/OSGM15).

2. All levels relate to Ordnance Survey Datum (Newlyn). Vertical control has been established using GPS observations to the OS Active Network and the latest Ordnance Survey transformation (OSNTS/OSGM15).

3. Local Scale Factor has been removed to transform the survey to a flat earth grid (scale factor 1.0000). Local Grid Origin is Control Station M3. This is the only point where OS Grid coordinates are true.

Surveyed by: Initials: MR.AL

Date: 20/10/2023

Original Issue: AL MR

Revised: Rev. Date Purpose of revision Drawn/Checked

Site Surveying Services Ltd. Unit 9, Twin Brook Business Park, Ives Brook Road, Chesham BB7 1GX. T. 01290 438320 W. www.sitesurvey.co.uk

Client: MAZE PLANNING

Project: LEISURE LAKES

Drawing title: TOPOGRAPHICAL SURVEY

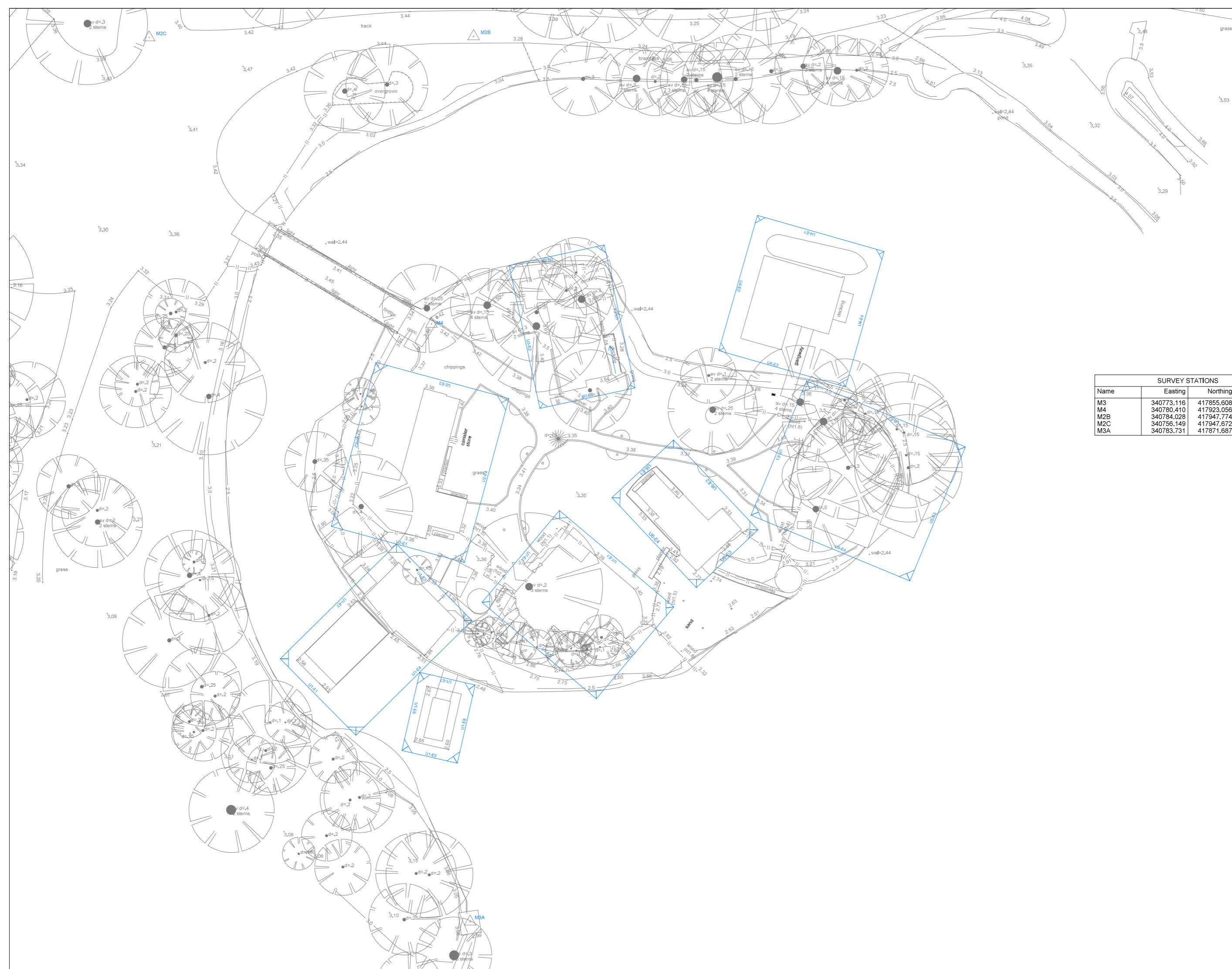
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Client Job No.

Drawing number: S23747-DR01

Rev: A

This drawing is not to be used in whole or part other than for the intended purpose and project as defined on this drawing. Refer to the contract for full terms and conditions.



MBS ELEVATIONS - LEGEND

- BUILDING EDGE
- GLAZING
- WINDOW REVEALS
- DOORS
- GROUND LINE
- METAL WORK
- MISCELLANEOUS
- PIPES
- RAINWATER PIPES
- RIDGES
- ROOF
- SERVICES
- STONE
- TIMBER
- VEGETATION

SURVEY STATIONS		
Name	Easting	Northing
M3	340773.116	417855.608
M4	340780.410	417923.056
M2B	340784.028	417947.774
M2C	340756.149	417947.672
M3A	340763.731	417871.667

*Some columns/beams may be obscured by plaster / fire boarding / concrete / casing. Therefore the true structural position may not be shown.

*Some site areas may be inaccessible. See highlighted areas for further details.

 ASSUMED

This elements and areas may be shown as assumed, with dashed lines, where possible.

- This survey may relate to an external Coordinate system. If details such as position and orientation relative to this are required please get in touch.
- All dimensions and measurements given are Scale Factor 1.

Surveyed by	Initials - SF
D	
C	
R	
A	20/10/2023 Original Issue
Rev	Rev. Date Purpose of revision Drawn



Client: MAZE PLANNING

Project: LEISURE LAKES- 4 SEASONS GLAMPING PODS

Drawing title: LOCATION PLAN

Scale	1:100 @ A0	DO NOT SCALE
SSS - Job No.	S23747	
Client Job No.		
Drawing number	S23747-DR02	Rev. A

This drawing is not to be used in whole or part other than for the intended purpose and project as defined on this drawing. Refer to the contract for full terms and conditions.

BUILDING EDGE

GLAZING

WINDOW REVEALS

DOORS

GROUND LINE

METAL WORK

MISCELLANEOUS

PIPES

RAINWATER PIPES

RODGES

ROOF

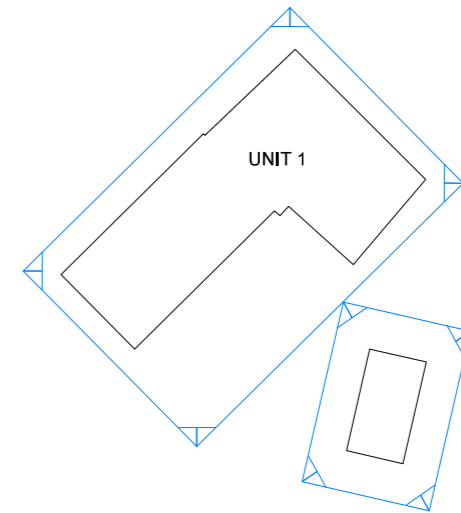
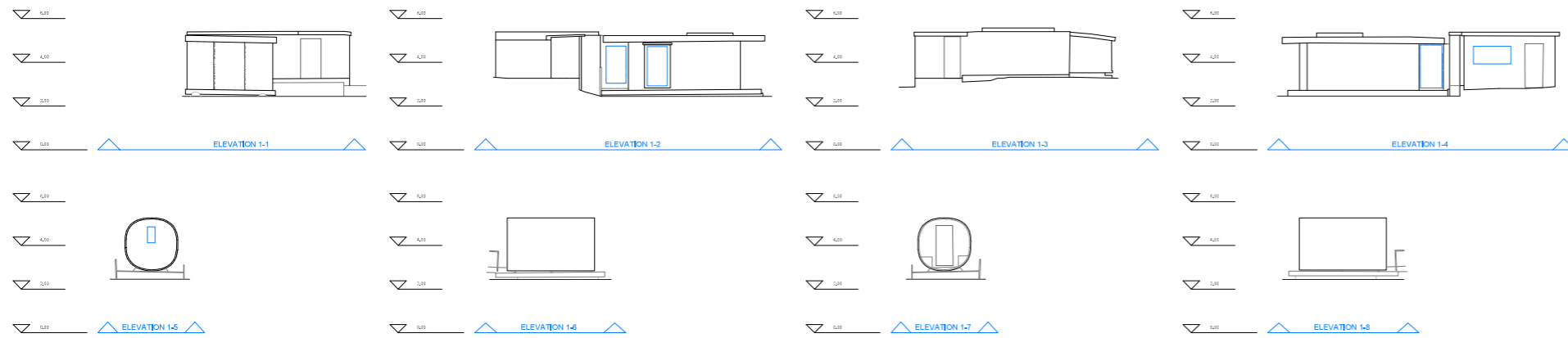
SERVICES

STONE

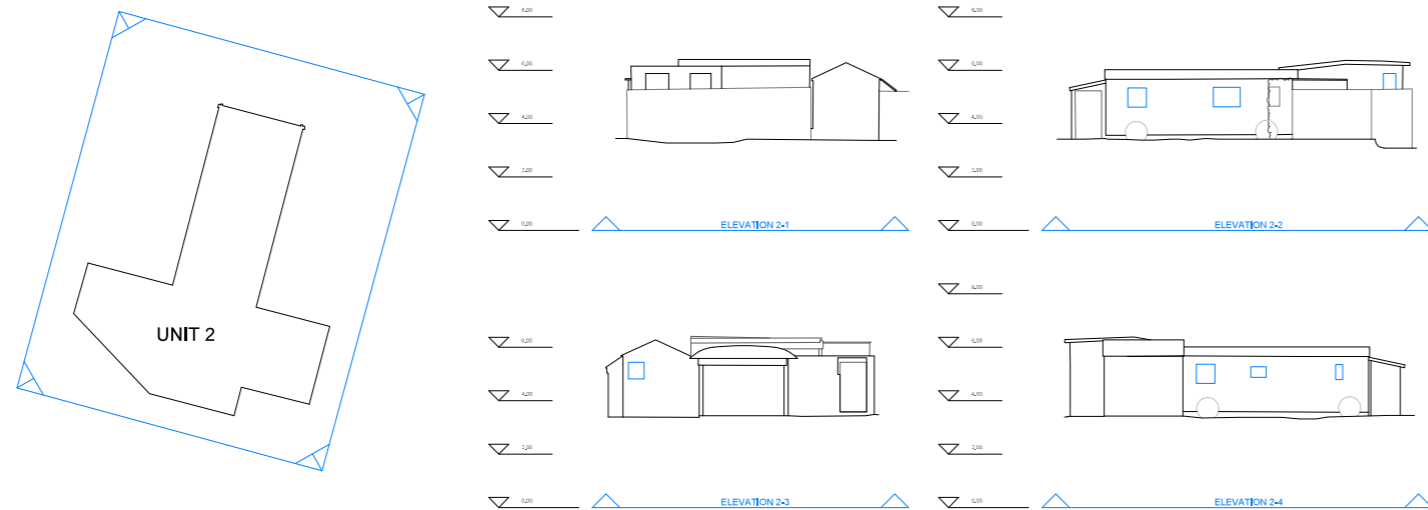
TIMBER

VEGETATION

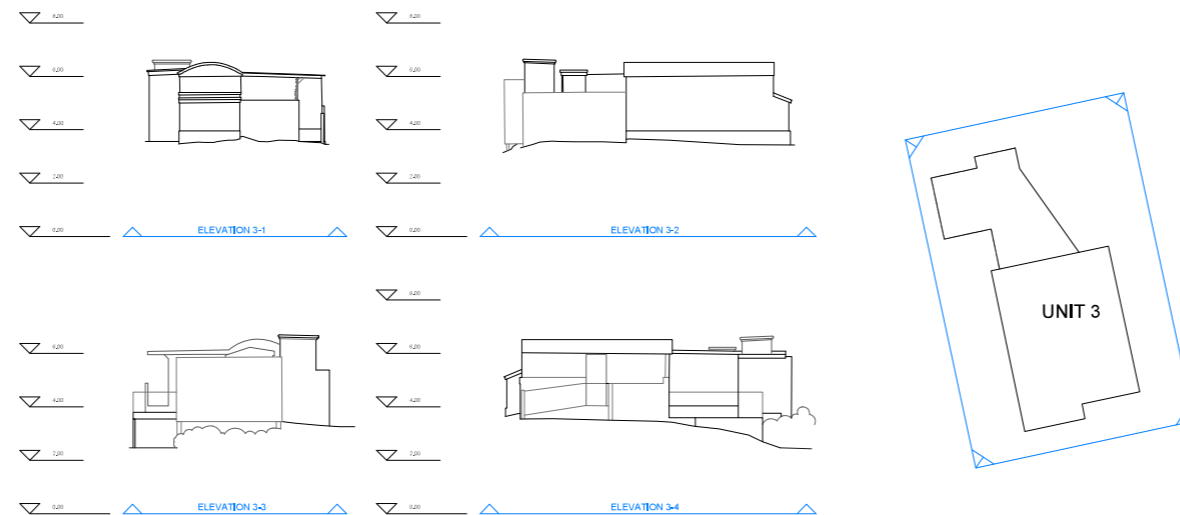
UNIT 1



UNIT 2



UNIT 3



*Some columns/beams may be obscured by plaster / fire boarding / concrete / casing. Therefore the true structural position may not be shown.

*Some site areas may be inaccessible. See highlighted areas for further details.

ASSUMED
This elements and areas may be shown as assumed, with dashed lines, Where possible.

1. This survey may relate to an external Coordinate system. If details such as position and orientation relative to this are required please get in touch.

2. All dimensions and measurements given are Scale Factor 1.

Surveyed by		Initials - SF	
D			
C			
B			
A	20/10/2023	Original Issue	FB SF
Rev	Rev. Date	Purpose of revision	Drawn / checked



Client
MAZE PLANNING

Project
LEISURE LAKES- 4 SEASONS GLAMPING PODS

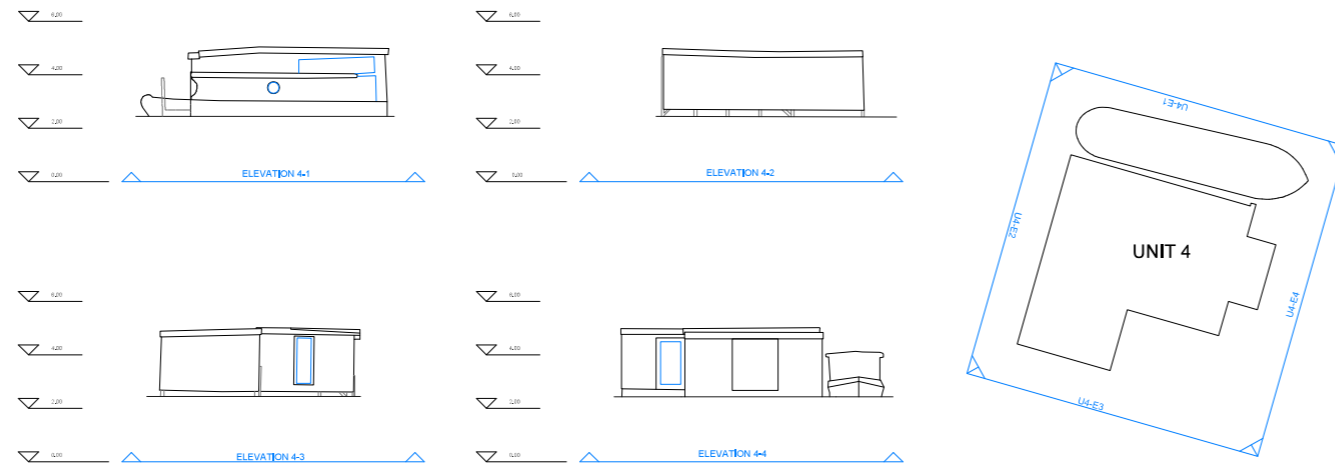
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ELEVATIONS 1

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Client Job No.		
Drawing number	S23747-DR03	Rev A

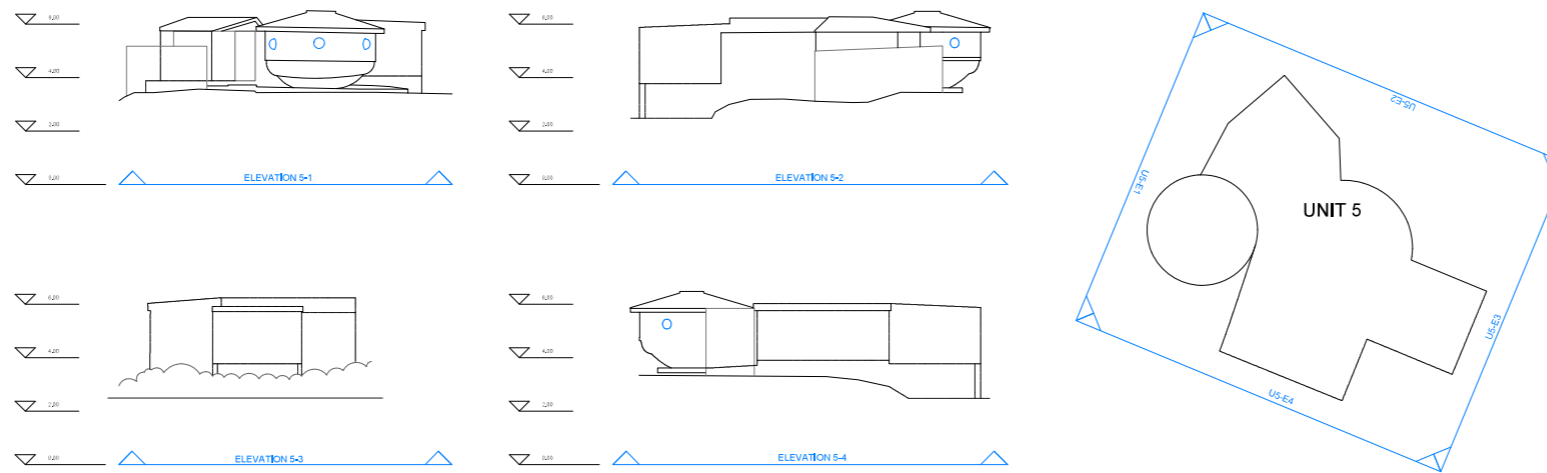
This drawing is not to be used in whole or part other than for the intended purpose and project as defined on this drawing. Refer to the contract for full terms and conditions.

- BUILDING EDGE**
- GLAZING**
- WINDOW REVEALS
- DOORS
- GROUND LINE**
- METAL WORK
- MISCELLANEOUS
- PIPES
- RAINWATER PIPES**
- RODGES**
- ROOF**
- SERVICES
- STONE
- TIMBER
- VEGETATION

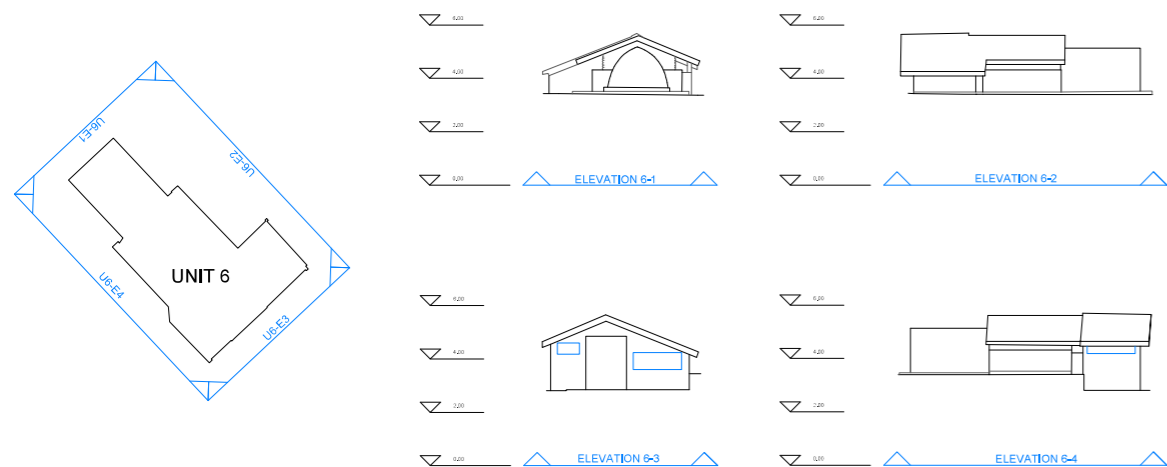
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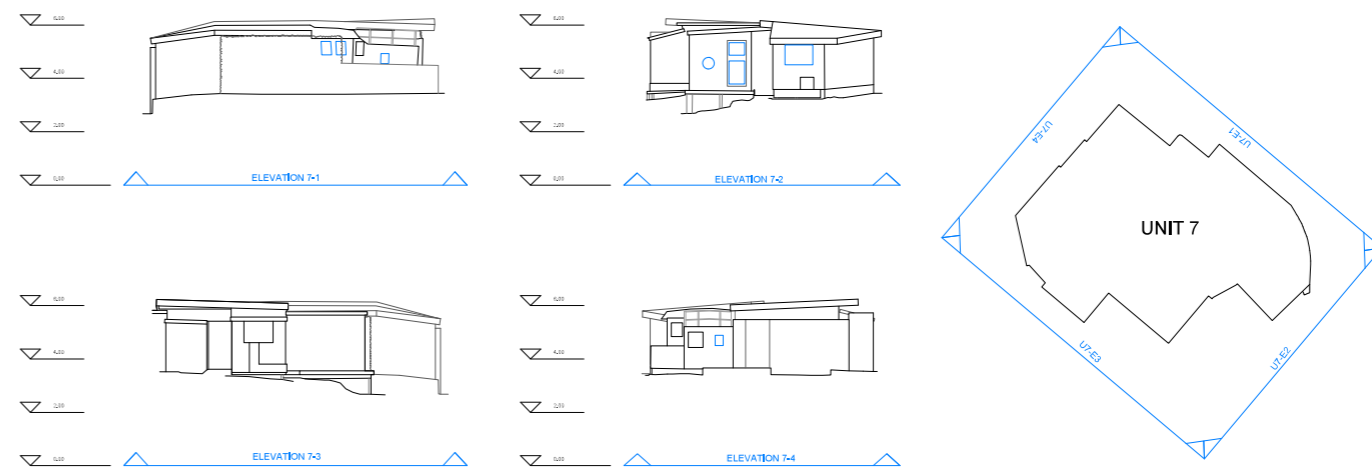
UNIT 5



UNIT 6



UNIT 7



*Some columns/beams may be obscured by plaster / fire boarding / concrete / casing. Therefore the true structural position may not be shown.

*Some site areas may be inaccessible. See highlighted areas for further details. ASSUMED

This elements and areas may be shown as assumed, with dashed lines. Where possible,

1. This survey may relate to an external Coordinate system. If details such as position and orientation relative to this are required please get in touch.

2. All dimensions and measurements given are Scale Factor 1.

Surveyed by	Initials - SF		
D			
C			
B			
A	20/10/2023	Original Issue	FB SF
Rev	Rev. Date	Purpose of revision	Drawn / checked



Client: MAZE PLANNING

Project: LEISURE LAKES- 4 SEASONS GLAMPING PODS

Drawing title: ELEVATIONS 2

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Client Job No.		
Drawing number	S23747-DR04	Rev A

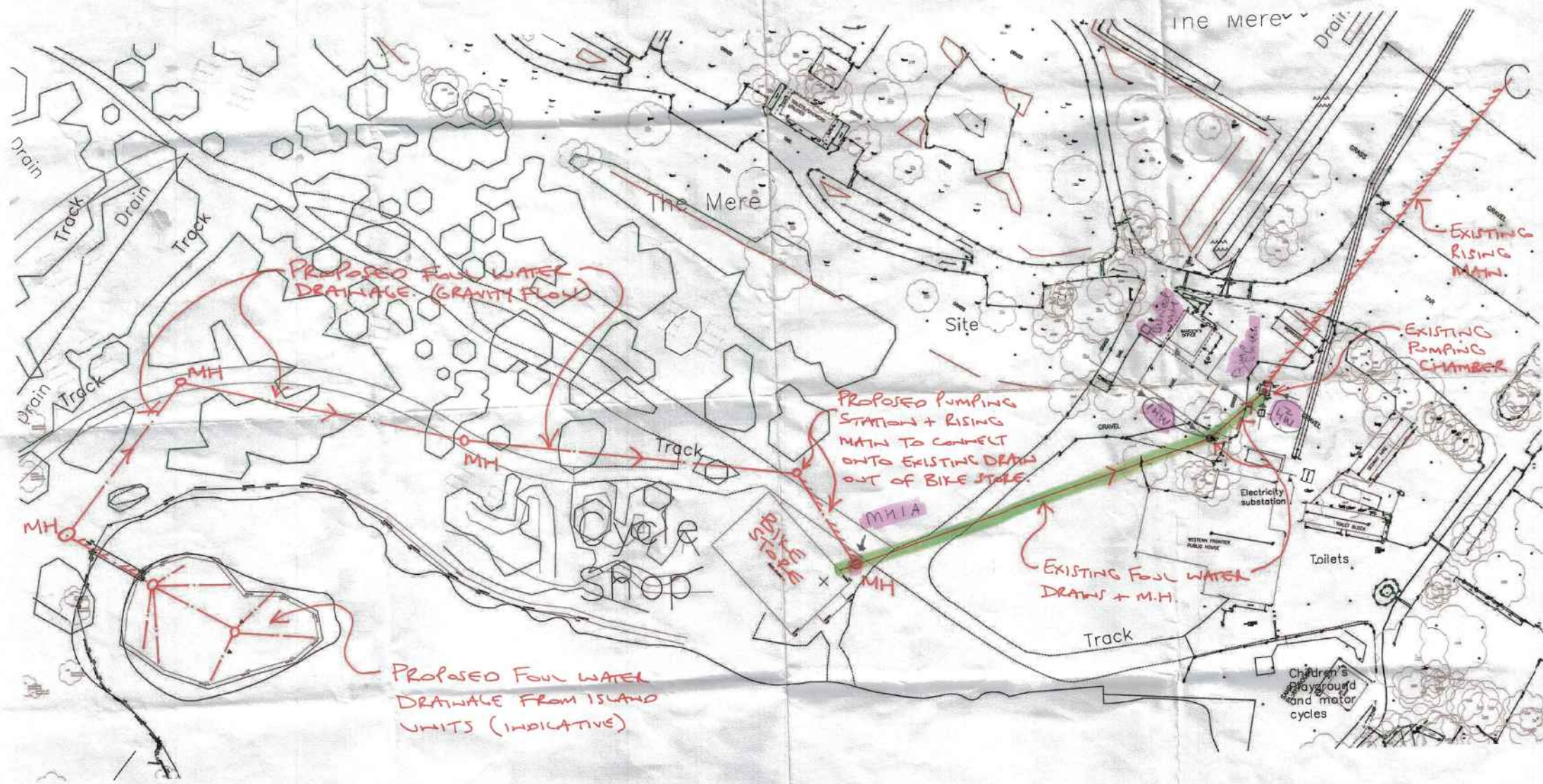
This drawing is not to be used in whole or part other than for the intended purpose and project as defined on this drawing. Refer to the contract for full terms and conditions.

Appendix 'B'

Extract from Drain Alert CCTV Drainage Survey

Directors: I.Schofield BSc (Hons) MSc, C Eng, MI Struct E ❖ M.O'Sullivan MSc, I Eng, IMI Struct E. AMICE
Consultant: G. Schofield C Eng, MI Struct E, MICE, MIEI

EXTENT OF PROPOSED
CCTV DRAIN SURVEY.



PROPOSED Foul WATER
DRAINAGE (GRAVITY FLOW)

PROPOSED Pumping
Station + RISING
MAIN TO CONNECT
ONTO EXISTING DRAIN
OUT OF BIKE STORE.

PROPOSED Foul WATER
DRAINAGE FROM ISLAND
UNITS (INDICATIVE)

I.S. GSA
JAN 24

2024.006.Ska1



Manhole Record Card

Number	<input type="text" value="MH1A"/>	Date Of Survey	<input type="text" value="01/03/2024"/>
Status	<input type="text" value="PR"/>	Function	<input type="text" value="F"/>
		Type	<input type="text" value="M"/>

Cover Details:

Square Recta Double Triang Single Triangl Circular Multiple Hinged Lockable

CoverLevel Cover Load Class

Cover	<input type="text" value="650"/> X <input type="text" value="500"/>	Chamber	<input type="text" value="0"/> X <input type="text" value="0"/>	EvidenceOfSurcharge	<input type="checkbox"/>
Shaft	<input type="text" value="0"/> X <input type="text" value="0"/>	ShaftDepth	<input type="text" value="0"/>	ToxicAtmosphere	<input type="checkbox"/>
Brick	<input checked="" type="checkbox"/>	Precast Concrete	<input type="checkbox"/>	PVC	<input type="checkbox"/>
Reducing Slab	<input type="checkbox"/>	Taper	<input type="checkbox"/>	Side Entry	<input type="checkbox"/>
		No.Land	<input type="text" value="0"/>	Step Irons	<input type="checkbox"/>
		Segments	<input type="checkbox"/>	No.RegCourses	<input type="text"/>
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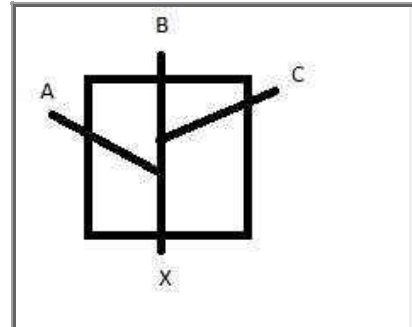
PlanPhoto



LocationPhoto



PlanofManhol



Chamber Conditions:

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Irons/Ladder	<input type="text" value="OK"/>	Chamber	<input type="text" value="OK"/>
Benching/Channel	<input type="text" value="OK"/>		

Pipe	Invert L	Depth	Fr	UpstreamRe	Downstream	Pipe Sh	Size	Height	Size	Width	Pipe Material	Lin
A	-0.350	0.35	SP			C			100		PVC	
B	-0.450	0.45	UNKNOW			C			100		PVC	
C	-0.360	0.36	UNKNOW			C			100		PVC	
X	-0.700	0.70			MH1	C			100		PVC	

Disclaimer - Any dimensions and levels provided on this form should be checked before being relied upon. It is the responsibility of the customer to verify all information given with regards to the drainage prior to designing or commencing any work on site.



Manhole Record Card

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Status	<input type="text" value="PR"/>	Function	<input type="text" value="F"/>
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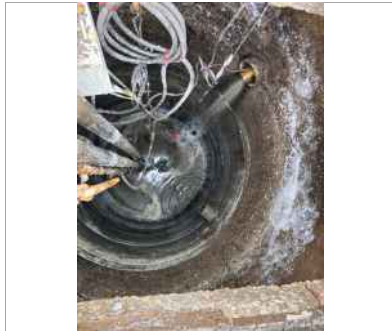
Cover Details:

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CoverLevel Cover Load Class

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Brick	<input type="checkbox"/>	Precast Concrete	<input checked="" type="checkbox"/>	PVC	<input type="checkbox"/>
Reducing Slab	<input type="checkbox"/>	Taper	<input type="checkbox"/>	Side Entry	<input type="checkbox"/>
		No.Land	<input type="text" value="0"/>	Step Irons	<input type="checkbox"/>
		Segments	<input type="checkbox"/>	No.RegCourses	<input type="text"/>
		Ladder	<input type="checkbox"/>		

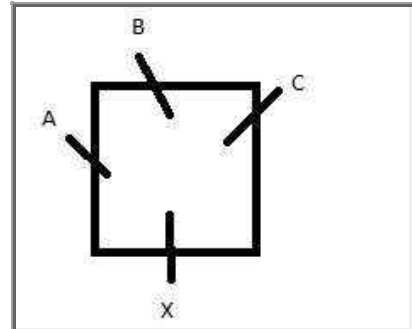
PlanPhoto



LocationPhoto



PlanofManhol



Chamber Conditions:

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Benching/Channel	<input type="text" value="OK"/>		

Pipe	Invert L	Depth	Fr	UpstreamRe	Downstream	Pipe Sh	Size	Height	Size	Width	Pipe Material	Lin
A	-2.860	2.86				C			150		VC	
B	-1.160	1.16				C			150		VC	
C	-2.120	2.12				C			150		VC	
X	-1.050	1.05			RISING M	C			150		VC	

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Manhole Record Card

Number	<input type="text" value="MH2"/>	Date Of Survey	<input type="text" value="13/02/2024"/>
Status	<input type="text" value="PR"/>	Function	<input type="text" value="C"/>
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Cover Details:

Square Recta Double Triang Single Triangl Circular Multiple Hinged Lockable

CoverLevel Cover Load Class

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Brick	<input checked="" type="checkbox"/>	Precast Concrete	<input type="checkbox"/>	PVC	<input type="checkbox"/>
Reducing Slab	<input type="checkbox"/>	Taper	<input type="checkbox"/>	Side Entry	<input type="checkbox"/>
		No.Land	<input type="text" value="0"/>	Step Irons	<input type="checkbox"/>
		Segments	<input type="checkbox"/>	Ladder	<input type="checkbox"/>
		No.RegCourses	<input type="text"/>		

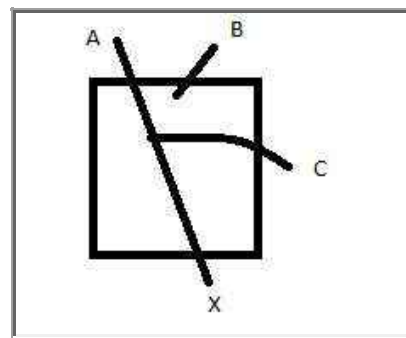
PlanPhoto



LocationPhoto



PlanofManhol



Chamber Conditions:

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Irons/Ladder	<input type="text" value="OK"/>	Chamber	<input type="text" value="OK"/>
Benching/Channel	<input type="text" value="OK"/>		

Pipe	Invert L	Depth	Fr	UpstreamRe	Downstream	Pipe Sh	Size	Height	Size	Width	Pipe Material	Lin
A	-1.010	1.01	UNKNOW			C			150		VC	
B	-0.660	0.66	UNKNOW			C			100		VC	
C	-0.820	0.82	BURIED M			C			100		VC	
X	-1.030	1.03			PUMP ST	C			150		VC	

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Manhole Record Card

Number	<input type="text" value="MH1"/>	Date Of Survey	<input type="text" value="13/02/2024"/>
Status	<input type="text" value="PR"/>	Function	<input type="text" value="F"/>
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Cover Details:

Square Recta Double Triang Single Triangl Circular Multiple Hinged Lockable

CoverLevel Cover Load Class

Cover	<input type="text" value="600"/> X <input type="text" value="450"/>	Chamber	<input type="text" value="0"/> X <input type="text" value="0"/>	EvidenceOfSurcharge	<input type="checkbox"/>
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Brick	<input type="checkbox"/>	Precast Concrete	<input checked="" type="checkbox"/>	PVC	<input type="checkbox"/>
Reducing Slab	<input type="checkbox"/>	Taper	<input type="checkbox"/>	Side Entry	<input type="checkbox"/>
		No.Land	<input type="text" value="0"/>	Step Irons	<input type="checkbox"/>
		Segments	<input type="checkbox"/>	No.RegCourses	<input type="text"/>
		Ladder	<input type="checkbox"/>		

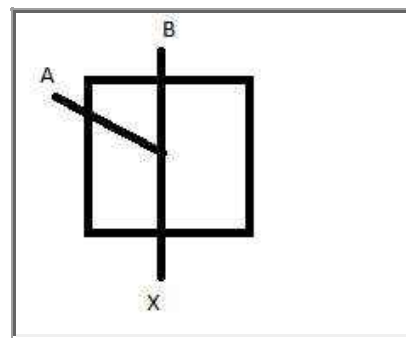
PlanPhoto



LocationPhoto



PlanofManhol



Chamber Conditions:

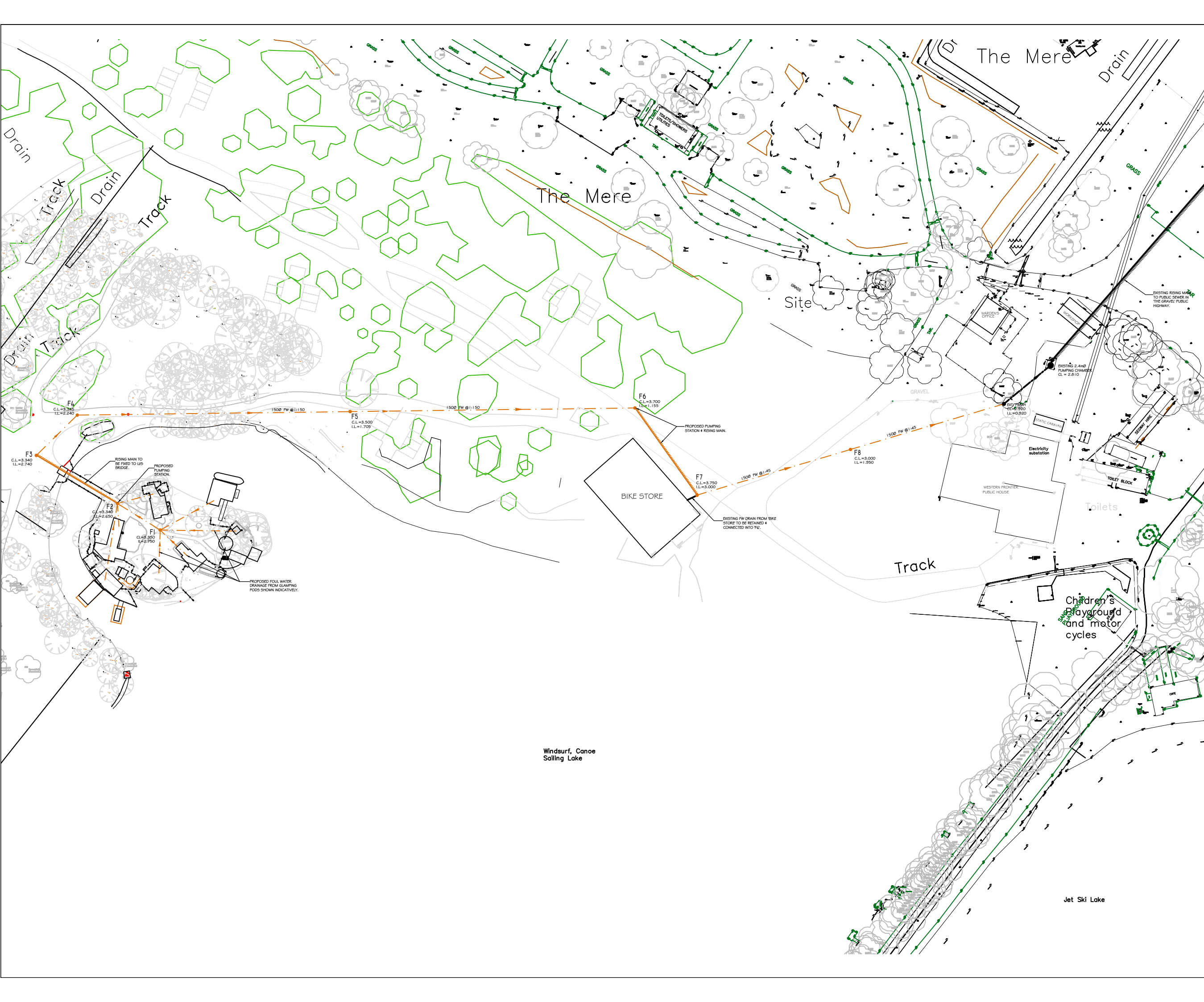
Cover	<input type="text" value="OK"/>	Shaft	<input type="text" value="OK"/>
Irons/Ladder	<input type="text" value="OK"/>	Chamber	<input type="text" value="OK"/>
Benching/Channel	<input type="text" value="OK"/>		

Pipe	Invert L	Depth	Fr	UpstreamRe	Downstream	Pipe Sh	Size	Height	Size	Width	Pipe Material	Lin
A	-2.010	2.01				C			150		VC	
B	-2.030	2.03				C			150		VC	
X	-2.050	2.05			PUMP ST	C			150		VC	

Disclaimer - Any dimensions and levels provided on this form should be checked before being relied upon. It is the responsibility of the customer to verify all information given with regards to the drainage prior to designing or commencing any work on site.

Appendix 'C'

GSA Drawing Number 2024.066.001 – Proposed Drainage Layout



- NOTES**
1. ALL UNDERGROUND DRAINAGE IS TO BE EITHER EXTRA STRENGTH CLAY PIPES TO B.5 EN 295 OR CONCRETE PIPES TO BS 5911 - STRENGTH CLASS M, OR FLEXIBLE PIPES IN ACCORDANCE WITH TABLE 7 OF BUILDING REGULATIONS APPROVED DOCUMENT H LAID IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS AND LOCAL AUTHORITY REQUIREMENTS.
 2. PIPE BEDDING GENERALLY IS TO BE CLASS 5 GRANULAR BED AND SURROUND AS DETAILED EXCEPT FOR PIPES HAVING LESS THAN 900mm COVER UNDER ROADS CARPARKS AND HARDSTANDING OR LESS THAN 600mm COVER IN SOFT AREAS WHICH ARE TO BE SURROUNDED IN CONCRETE GRADE GEN 3 TO B.5.8500. MIN. 150mm ALL ROUND WITH FLEXIBLE JOINTS AT MAXIMUM 5m CENTRES (FROM MIN. 15mm FIBREBOARD), BUT SEE ALSO NOTE 6 FOR PVC LAND DRAINS.
 3. CONNECTIONS TO ADOPTED SEWERS ARE TO BE MADE IN ACCORDANCE WITH THE REQUIREMENTS OF THE RELEVANT AUTHORITIES AND SEWERS FOR ADOPTION 7th EDITION. DRAINAGE WORK GENERALLY IS TO COMPLY WITH THE BUILDING REGULATIONS 2002 APPROVED DOCUMENT H AND B.5. E.N. 752-4
 4. ALL RAIN WATER PIPES ARE TO DISCHARGE INTO TRAPPED GULLIES WITH RODDING ACCESS. POSITIONS SHOWN MAY BE INDICATIVE ONLY ACTUAL LOCATIONS ARE TO BE CONFIRMED.

LEGEND

	EXISTING FOUL WATER DRAINS
	EXISTING FOUL WATER RISING MAIN
	PROPOSED FOUL WATER DRAINS
	PROPOSED FOUL WATER RISING MAIN

- RESIDUAL RISKS**
1. EXISTING UNDER GROUND SERVICES
 2. DEEP EXCAVATIONS



REV.	DESCRIPTION	DRAWN	APPROVED	DATE

STATUS **FOR APPROVAL**

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client
LEISURE LAKES LTD.

project
 PROPOSED GLAMPING PODS
 LEISURE LAKES
 MERE BROW

title
 PROPOSED DRAINAGE LAYOUT

drawn IS	checked	drawing number
date MAR 24	date	2024 - 066 - 001
scale 1:500	A1	

Windsurf, Canoe Sailing Lake

Jet Ski Lake