110-112 EAST STREET

Bristol, BS3 4EY

FLOOD RISK ASSESSMENT, DRAINAGE & SEQUENTIAL TEST CONSIDERATIONS

Project No	24-329-60
Revision No	02
Issue date	03/03/25

Transport Planning | Flood Risk & Hydrology | Infrastructure & Drainage

Control Sheet

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1 EXECUTIVE SUMMARY

1.1.1 Planning permission is being sought for a change of use of a ground floor public to commercial space, first and second floor commercial space to residential units and the demolition and of existing rear extensions to deliver 16-bedroom house of multiple occupancy.

1.1.2 The majority of the site is located in Flood Zone 2 and a small part of the northeastern corner of the site is located in SFRA Flood Zone 3 (2120) and as such this document considers the flood risk to the site from all sources.

1.1.3 The finished floor level for the existing ground floor is located at least 900mm above design flood depths. The existing floor levels will remain as existing. Consequently, the units themselves will be elevated above potential flood levels so will be at negligible risk of suffering flood damage.

1.1.4 As a result, no additional mitigation is proposed.

1.1.5 The nature of the units is that they would provide a place of safe refuge during flood conditions, with evacuation very unlikely be required. In the event emergency access is required, dry escape would be possible onto East Street during the design event.

1.1.6 The existing site is entirely impermeable. Consequently, the development would have negligible impact on local drainage. However, by way of providing some benefit, the detailed designs will consider the use of SuDS planters fitted to downpipes to slow the flow of runoff compared to existing.

1.1.7 This Flood Risk Assessment shows that the development will be safe for its lifetime and therefore meets the requirements of the National Planning Policy Framework and the Flood Risk and Coastal Change Planning Practice Guidance.

2 INTRODUCTION

2.1 Background

2.1.1 Calibro has been appointed by *Paragon Bristol Developments Ltd* to undertake a Flood Risk Assessment (FRA) for a change of use and reconfiguration of a vacant public house in Bedminster, Bristol.

2.1.2 The National Planning Policy Framework (NPPF) requires that the planning system takes full account of flood risk. This requires that:

- Within the site, the most vulnerable development is located in areas of lowest flood risk, unless there are overriding reasons to prefer a different location;
- The development is appropriately flood resistant and resilient such that, in the event of a flood, it could be quickly brought back into use without significant refurbishment;
- It incorporates sustainable drainage systems, unless there is clear evidence that this would be inappropriate;
- Any residual risk can be safely managed;
- Safe access and escape routes are included where appropriate, as part of an agreed emergency plan.

2.1.3 Footnote 63 of the NPPF states that a site-specific FRA will be required for proposals:

a) that are greater than 1 hectare in area within Flood Zone 1;

b) that are located in Flood Zones 2 and 3;

c) in an area within Flood Zone 1 which has critical drainage problems;

d) in an area within Flood Zone 1 identified in a Strategic Flood Risk Assessment as being at flood risk now or in the future;

e) in an area in Flood Zone 1 that may be subject to other sources of flooding, where its development would introduce a more vulnerable use.

2.1.4 The site falls mostly within Flood Zone 2 and as such an FRA is required.

2.1.5 This assessment considers the risks of all types of flooding to the site for the lifetime of the development and ensures that flooding is made no worse off site.

3 EXISTING SITE AND HYDROLOGY CHARACTERISTICS

3.1 Site Description

3.1.1 The site is located on East Street, Bedminster and is currently occupied by the vacant Assembly public house. The approximate coordinates at the centre of the site are 358490, 171580 and the site area is approximately 620m^2. Figure 3-1 shows the site location.

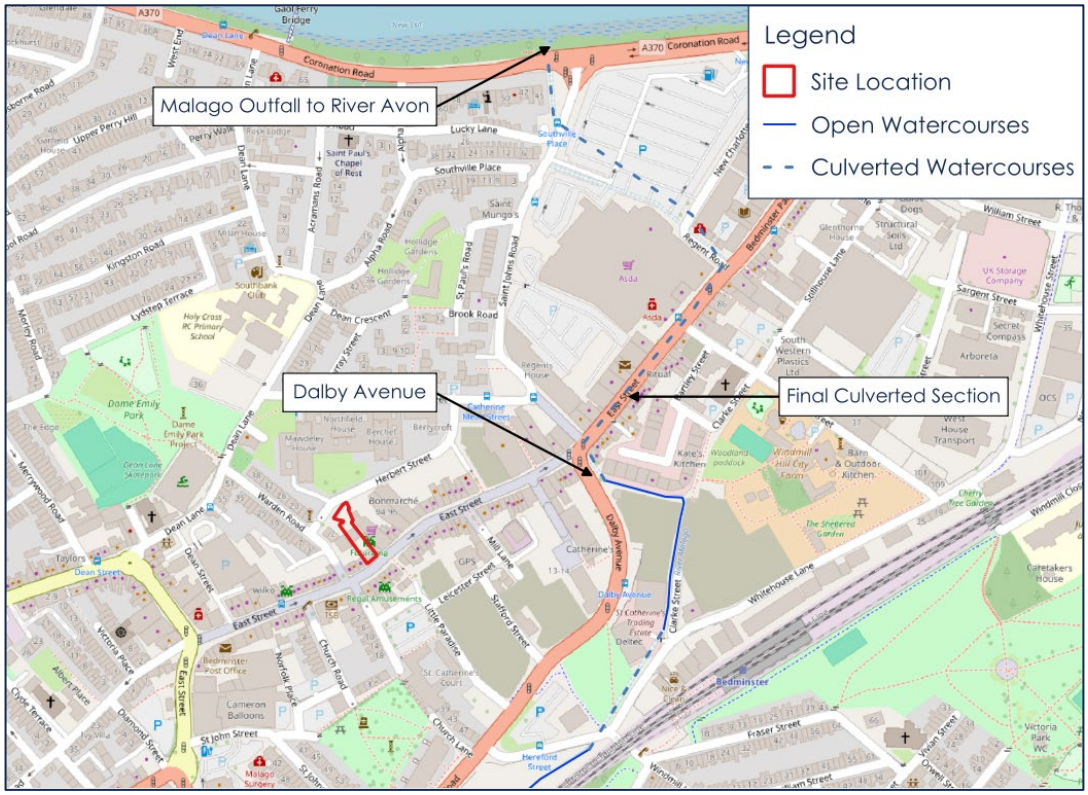
Figure 3-1 Site Location

3.2 Hydrology and Topography

3.2.1 There are no known watercourses within the immediate vicinity of the site, but the site and surrounding areas are served by a positive drainage network.

3.2.2 The site is situated approximately 220m west of the entrance to the final culverted section of the River Malago, at Dalby Avenue. This culvert discharges to the tidal River Avon approximately 450m north of the site. Figure 3-2 shows the route of the Malago in relation to the site.

Figure 3-2 Watercourses



3.2.3 The site topographic survey, included in Appendix A, shows the site slopes down to the rear (northwest) with the lowest point being approximately 8.31mAOD. Levels adjacent to the existing building are at approximately 8.6mAOD. The internal finished floor levels are approximately 9.4mAOD.

3.2.4 The site is entirely hardstanding, predominantly comprising existing buildings and a small car park and yard in the northern extent of the site.

3.3 Geology and Soils

3.3.1 Geological data held by the British Geological Survey (BGS) show that entire site is underlain by '*Redcliffe member Sandstone'* sandstone with '*Tidal Flat Deposits – Clay and Sand'* superficial deposits being recorded at the site.

3.3.2 The BGS Hydrogeology aquifer classification (625k) records the geology under the site and immediate surrounding areas being underlain by a '*Moderately productive aquifer'*.

3.3.3 The Soilscapes web mapping identifies the soils beneath the southern part of the site as '*Slightly acid loamy and clayey soils with impeded drainage'* with soils in the northern part of the site being identified as '*Loamy and clayey floodplain soils with naturally high groundwater'*.

4 PROPOSED DEVELOPMENT

4.1 Site Proposals

4.1.1 The proposals include the change of use of the vacant pub and demolition of the rear buildings to deliver a 16-bed house of multiple occupation (HMO) and a ground floor commercial unit fronting East Street.

4.1.2 The existing floor level of 9.4mAOD will be retained by the proposals.

4.1.3 Some minor areas of landscaping are proposed but for the purposes of this assessment, it is presumed the hardstanding footprint would remain as per existing.

4.1.4 Access will remain from ground level and East Street.

4.1.5 As residential dwellings, the anticipated lifetime of the development would be 100 years.

4.1.6 Site proposals are shown in Appendix B.

4.2 Development Vulnerability

4.2.1 Table 2 of the Flood Risk and Coastal Change Planning Practice Guidance (PPG) defines which types of development are acceptable in each flood zone and is reproduced in Table 4-1.

Table 4-1 Flood Risk Vulnerability

Flood Zone	Flood Risk Vulnerability				
	Essential Infrastructure	**Highly Vulnerable**	**More Vulnerable**	**Less Vulnerable**	**Water Compatible**
1	✓	✓	✓	✓	✓
2	✓	Exception Test Required	✓	✓	✓
3a	Exception Test Required	×	Exception Test Required	✓	✓
3b	Exception Test Required	×	×	×	✓

4.2.2 The site falls mostly within Flood Zone 2 and are therefore the proposals are deemed to be appropriate.

5 FLOOD RISK

5.1 National Planning Policy Framework (NPPF)

5.1.1 In accordance with the NPPF, this FRA considers the following sources of flooding:

1. Tidal Flooding – from the sea;
2. Fluvial Flooding – from rivers and streams;
3. Surface Water Flooding – from intense rainfall events;
4. Groundwater flooding – from elevated groundwater levels or springs;
5. Flooding from sewers – from existing sewer systems; and
6. Artificial sources – from reservoirs, canals etc.

5.2 Flood Zones

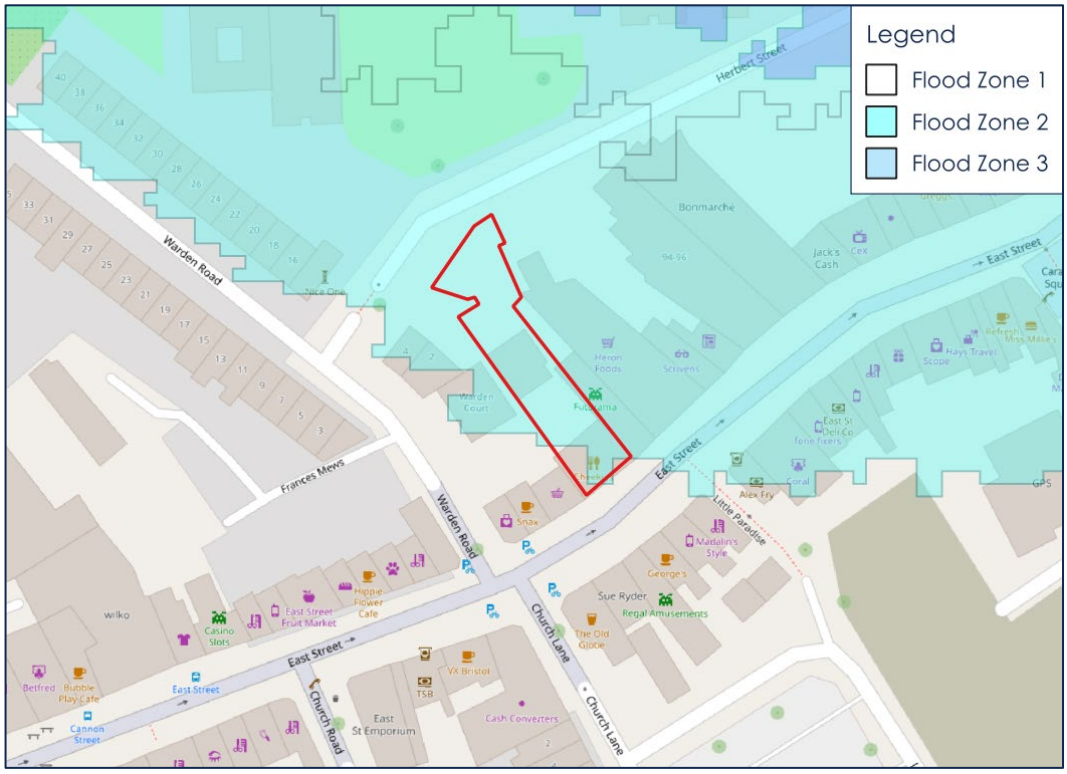
5.2.1 The Flood Zones are based on the assessed probability of the site flooding from rivers and the sea, ignoring the presence of flood defences. The flood zone classifications from the Planning Practice Guidance are presented in Table 5-1 below.

Table 5-1 Flood Zone Classification

Flood Zone	Risk	Fluvial Flooding Chance	Tidal Flooding Chance
1	Low	> 1 in 1,000 year	
2	Medium	Between 1 in 100 and 1 in 1,000 year	Between 1 in 200 and 1 in 1,000 year
3	High	Up to 1 in 100 year	Up to 1 in 200 year
3b	Functional Floodplain	Land where water has to flow or be stored in times of flood. This is defined in the relevant SFRA.	

5.2.1 The Flood Map for Planning shows the majority of the site is located within Flood Zone 2 and therefore at Medium risk of undefended flooding. Figure 2-1 shows the flood zones within the site.

Figure 5-1 Flood Map for Planning



5.2.2 The Bristol Strategic Flood Risk Assessment (SFRA), for the purposes of applying the Sequential Test, applies the future (2120) undefended flood extent, informed by the SFRA hydraulic modelling, the results of which have been provided by the Environment Agency and shown in Figure 5-2.

Figure 5-2 SFRA Flood Zone 3 2120

5.3 Tidal and Fluvial Flooding

5.3.1 As shown in Figure 5-2, part of the site redline boundary falls within the 2120 Flood Zone 3 extent.

5.3.2 Inspection of the data shows the flooding predicted in the 2120 Flood Zone 3 is from a fluvial dominant event (which is more severe than tidally-dominant). The level associated with this event is just under 8.5mAOD at the site. The existing and proposed building footprint would be set at 9.4mAOD therefore at least 900mm above the flood level.

5.3.3 The proposals would therefore remain safe during a future undefended future fluvial dominant event and consequently should be beyond the intended scope of the Sequential Test.

5.3.4 Outside the 2120 Flood Zone 3 extent, the site is at very low risk of flooding. Inspection of the Bristol Avon Flood Strategy model, provided by the Environment Agency, shows that the site falls outside the future (2130) fluvial-dominant 1 in 100 year event, presuming either the central or higher central climate change uplifts of 26% or 39% respectively. Figure 5-3 shows the site in relation to the more conservative 1 in 100 year +39% model results.

5.3.5 The above model output is considered to the be design event for the. This is also considered to be conservative given it is for the year 2130 therefore slightly beyond the anticipated 100 year lifetime of the scheme. It also applies a 39% uplift to flows, i.e. the higher central climate change scenario. This is greater than the central (26%

uplift) required for the Avon Bristol and North Somerset Streams management catchment for a residential development.

Figure 5-3 Bristol Avon Flood Strategy Model

5.3.6 The same model results also show the site to be over 150m from the present day (year 2030) 1 in 1,000 year event extent.

5.4 Recorded Flooding

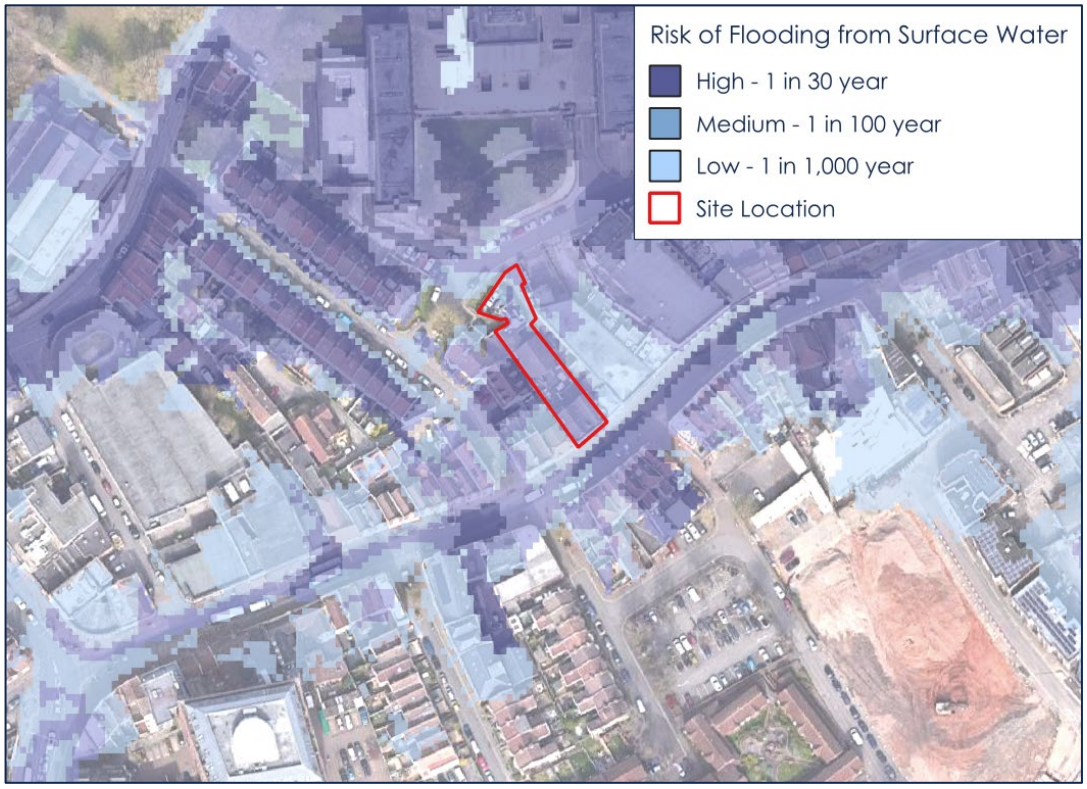
5.4.1 Although the River Malago is known to have suffered frequently from flood events in the past, including relatively recently, the EA 'Recorded Flood Outlines' dataset records no historic flood events at the site.

5.5 Surface Water Flooding

5.5.1 The January 2025 iteration of the Risk of Flooding from Surface Water (RoFSW) dataset indicates areas where surface water is likely to flow and accumulate. It also includes a dataset that estimates the likely impacts of climate change.

5.5.2 The dataset predicts the site and surrounding areas to be at risk from surface water flooding, as shown in Figure 5-4.

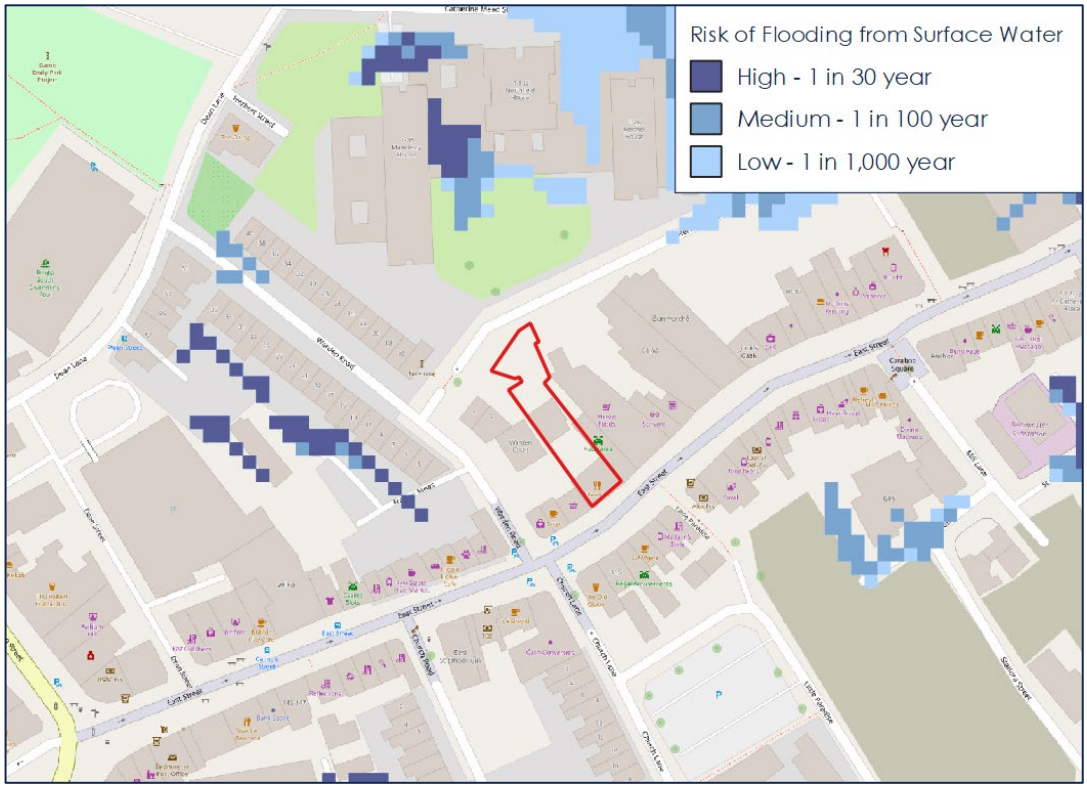
Figure 5-4 RoFSW Extents



5.5.3 However, analysis of the dataset concludes that the reason for such extensive modelled flooding is that it is likely the RoFSW model doesn't account for the presence of the culverted sections of the River Malago. Furthermore, it is unlikely to reflect the various flood management structures present in the upper reaches of the River Malago such as the Malago Interceptor. These intercept high flows in the river and diverts them away from the site catchment, discharging to the River Avon downstream of the site.

5.5.4 The previous (pre-January 2025) iteration of the RoFSW modelling was based on the Bristol Surface Water Management Plan (SWMP) model. Unlike the latest iteration of the RoFSW model, the SWMP model was specific to the city, rather than a nationwide modelling exercise and represented the strategic sewer network in the city. It also represented the culverted watercourses and the strategic flood management infrastructure referred to above. This dataset predicts that the site is at **Very Low** risk of surface water flooding (Figure 5-4).

Figure 5-5 Previous RoFSW Extents



5.5.5 As demonstrated in Section 5.2, the site is at very low risk from fluvial flooding. In addition, as per the previous iteration of the RoFSW modelling, the Bristol Avon Flood Strategy model that predicts the fluvial risk to the site is understood to reflect the various culverts and flood management infrastructure.

5.5.6 Consequently, the Bristol Avon Flood Strategy and previous RoFSW modelling are assessed as being the best available information to predict fluvial and surface water flood risk respectively at the site and the site is predicted to be at **Very Low** risk of surface water flooding.

5.6 Groundwater Flooding

5.6.1 It is recognised in the Bristol SFRA that groundwater flooding is not a significant risk across the city. In addition, the soil conditions and urban setting of the site are not conducive with groundwater flooding due to the impediment of the vertical migration of groundwater.

5.6.2 As a result, the risk to the site from groundwater sources is considered to be **Very Low.**

5.7 Flooding from Sewers

5.7.1 The area around the site is predominantly urban and therefore presumed to be served by a public sewer network, maintained and operated by Wessex Water. In the unlikely event of sewer flooding, resultant flooding would act as predicted by previous (pre-January 2025) iteration of the RoFSW mapping, therefore the risk of sewer flooding is considered to be **Very Low**.

5.8 Flooding from Artificial Sources

5.8.1 The Environment Agency 'Reservoir Flood Extents – Wet Day' identifies the site as being entirely within an area of potential inundation in the event of a reservoir breach.

5.8.2 All reservoirs which are represented in the reservoir flooding dataset fall under the requirements set out in the Reservoirs Act 1975. This act makes it a legal requirement to appoint a Supervising Engineer to produce an annual report and for the operator to address any issues raised therein. Since the introduction of the Reservoir Act, there have been no catastrophic failures of reservoirs. Consequently, it is considered that the probability of failure is very low and that the risk of flooding from reservoirs is very low.

5.8.3 The risk of flooding from artificial sources is concluded to be **Low**.

5.9 Sequential Test Implications

5.9.1 Paragraph 175 of the December 2024 iteration of the NPPF states that: '*The sequential test should be used in areas known to be at risk now or in the future from any form of flooding,* ***except*** *in situations where a site-specific flood risk assessment demonstrates that no built development within the site boundary, including access or escape routes, land raising or other potentially vulnerable elements, would be located on an area that would be at risk of flooding from any source, now and in the future (having regard to potential changes in flood risk).*' [emphasis added]

5.9.2 Based on the conclusions of this FRA, the site and its access onto East Street is at low or negligible risk of flooding from all sources, inclusive of climate change.

5.9.3 In addition, paragraph 176 of the NPPF states that '*Applications for some minor development and changes of use should also not be subject to the sequential test, nor the exception test set out below, but should still meet the requirements for site-specific flood risk assessments set out in footnote 63.*'

5.9.4 Although the site proposals include some demolition and the slight extension of the existing building, it is largely a change of use given existing buildings and use exists on the site.

5.9.5 Given the above, particularly the low risk of flooding posed to the site, the proposals should not be subject to the application of the sequential test.

5.10 Impact on Drainage

5.10.1 The proposals will retain the impermeable and building footprint of the existing. Consequently, the impact on local drainage would be **Negligible.**

5.10.2 Nonetheless, in accordance with the recommendations of the SFRA, proportionate measures are proposed to reduce the rate of runoff entering the sewer network. Although subject to detailed designs it is recommended at this stage that such measures would comprise SuDS planters attached to downpipes.

5.10.3 SuDS planters would reduce the rate of water entering the sewer network as well as provide multiple benefits including biodiversity and water quality, again demonstrating compliance with the SFRA.

5.11 Access and Egress

5.11.1 Given the proposed units would be comfortably above design or extreme future flood levels, they would by their nature be places of safe refuge. Furthermore, dry access onto East Street would remain even in an undefended future Flood Zone 3 flood event and an extreme defended event in 2130.

6 SUMMARY

6.1.1 Planning permission is being sought to change the use of a vacant public house to commercial space and demolish existing buildings to be replaced with a 16-bedroom HMO.

6.1.2 The Flood Map for Planning places the majority of the site within Flood Zone 2.

6.1.3 However, only the northeastern corner of the site is identified as being located in SFRA Flood Zone 3 (2120). Furthermore, the existing and proposed floor level of the building would be 900mm above the level associated with this event.

6.1.4 The site is at low risk of tidal and fluvial flooding, falling outside the predicted design flood extent. The design event applied is the 1 in 100 year +39% for the year 2130, which is a more significant event than the guidance requires.

6.1.5 The January 2025 iteration of the Risk of Flooding from Surface Water mapping shows the site and surrounding area to be at mapped risk of surface water flooding. However, analysis of the model outputs concludes the modelling is unlikely to reflect the flood management structures and culverted sections of the River Malago and therefore it overestimates the risk.

6.1.6 The previous iteration of the RoFSW mapping was based on the Bristol Surface Water Management Plan model, which represents the various culverts and structures in the Malago and is therefore considered to better reflect the actual risk of flooding to the site. This shows the site to be at very low risk of surface water flooding.

6.1.7 The nature of the units is that they would provide a place of safe refuge during extreme flood conditions. Furthermore, dry access onto East Street would remain during even an undefended flood event.

6.1.8 The December 2024 iteration of the National Planning Policy Framework clarifies the application of the sequential test. Paragraph 175 of the NPPF states that where a site specific Flood Risk Assessment demonstrates that no built development or site access is located in an area at risk of flooding, the sequential test shouldn't apply.

6.1.9 This assessment concludes the risk to the site is low or negligible from all sources and therefore the sequential test should not apply. Furthermore, no mitigation is required.

6.1.10 The change of use nature of the development would have negligible impact on local drainage. Nonetheless, proportionate measures are proposed to reduce flow rates to the sewer network and provide multiple benefits, in accordance with the SFRA.

6.1.11 This Flood Risk Assessment shows that the development will be safe for its lifetime and therefore meets the requirements of the NPPF and PPG.

APPENDICES

APPENDIX A

Topographic Survey

171620.00 N

171600.00 N

171580.00 N

171560.00 N

358480.00 E

358500.00 E

N

APPROX.

Stn A
358477.680 E
171607.007 N
8.253m

Stn B
358480.506 E
171600.584 N
8.470m

Stn C
358464.470 E
171591.088 N
8.877m

Stn D
358479.316 E
171581.991 N
12.582m

Stn E
358488.304 E
171570.137 N
12.496m

Stn F
358494.506 E
171575.861 N
12.496m

Stn G
358489.217 E
171588.767 N
8.898m

brick wall ht 0.90
gates
tarmac
brick wall ht 2.90
brick wall ht 2.15
brick wall ht 2.60
sh 13.85 hh 14.75
parapet 15.80
brick wall ht 2.00
steps up
metal
concr.
h/r
metal mesh fence ht 2.20
tarmac
roofing felt
brick wall ht 2.30
plastered wall ht 1.80
cbf ht 1.05
steps up
wpr ht 1.05
tiles
roofing felt
floor level 9.38
door
sh 10.40 hh 11.50
sh 10.80 hh 11.40
tarmac
parapet 16.93
mh(fws) cl 8.89 il 8.09
block wall ht 2.50
steps up
gate
rwp
conc.
door
2xØ100
Ø150
eave 12.90
mh(sws) cl 8.93 il 7.94
brick ret. wall
door
block ret. wall
door
floor level 12.60
sh 13.40 hh 14.65
parapet 16.93
hh 16.50
parapet 19.00
sh 13.65 hh 15.25 sh 16.40 hh 18.30
ridge 19.06
sh 11.75 hh 13.55 sh 14.65 hh 16.20
sh 11.75 hh 13.55 sh 14.65 hh 16.20
hh 10.70
sh 14.65 hh 16.20
hh 12.00
sh 14.65 hh 16.20
sh 14.95 hh 16.20
eave 16.62
eave 11.75
ridge 13.32
ridge 19.87
ridge 19.67
ridge 13.32
eave 12.60
eave 15.08 fascia 14.95
sh 10.60 hh 11.60
sh 13.40 hh 14.55
eave 17.28
ridge 18.00
sh 16.15 hh 17.20
plastered wall
ridge 19.07
eave 12.60
vent pipe
wood lap fence ht 1.05
roofing felt
brick ret. wall
step up
block ret. wall
A/C
wood lap fence ht 1.05
roofing felt
vent pipe
eave 15.08 fascia 14.95
ridge 20.57
eave 18.70
sh 16.40 hh 18.30
sh 16.50 hh 18.00
ridge 20.37
1No. overhead wire
flat roof 15.20
brick ret. wall
eave 18.57
sh 13.80 hh 14.80 sh 16.20 hh 17.20
ridge 19.02

sh 11.00 Windows ground floor
sh 11.00 Windows first floor
sh 11.00 Windows second floor
11.02 + Top of wall

STANDARD REFERENCES

ABBREVIATIONS

bl	bollard	lp	lamp post
bh	belisha beacon	mk	marker post
bw	barb wire	mh	manhole
bt	telecoms	nb	notice board
catv	cable TV cover	np	nameplate (road)
cl	cover level	p	post
conc	concrete	pm	pig mesh
cbrw	conc block ret. wall	ret.	retaining wall
cig	cable into ground	re	rodding eye
dk	drop kerb	rg	road gully
eic	electricity ic	rs	road sign
ESS	Elec. Sub-Station	rwp	rainwater pipe
ep	electricity pole	srw	stone ret. wall
fb	flower bed	sv	stop valve
fh	fire hydrant	svp	soil vent pipe
fl	floor level	sws	storm water sewer
fp	footpath	tcb	telephone callbox
fl.p	flagpole	tp	telegraph pole
fws	foul water sewer	tl	traffic light
g	gully	utr	unable to raise
gsv	gas valve	vp	vent pipe
ic	inspection cover	w'lap	woodlap fence
il	invert level	wm	water tap
irf	iron railing fence	wp	wood post
jb	junction box	wt	water tap
ko	kerb outlet		

GENERAL NOTES

NOTES

1. This survey has been computed and drawn about the Ordnance Survey National Grid.
2. All levels are in metres and relate to the Ordnance Survey active GPS stations.
3. This survey was measured for a scale of 1:100, any subsequent enlargements should be verified on site.

EXPANSE SURVEYS Ltd
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SURVEYED	PS	DATE	AUG 2024
DRAWN	PS	CHECKED	CK

DRAWING TITLE: Topographical Survey
110 East Street
Bedminster
Bristol

CLIENT: TMT Capital Ltd
417 Finchley Road
London
Camden
NW3 6HJ

DRAWING NO.: 164/2138/1

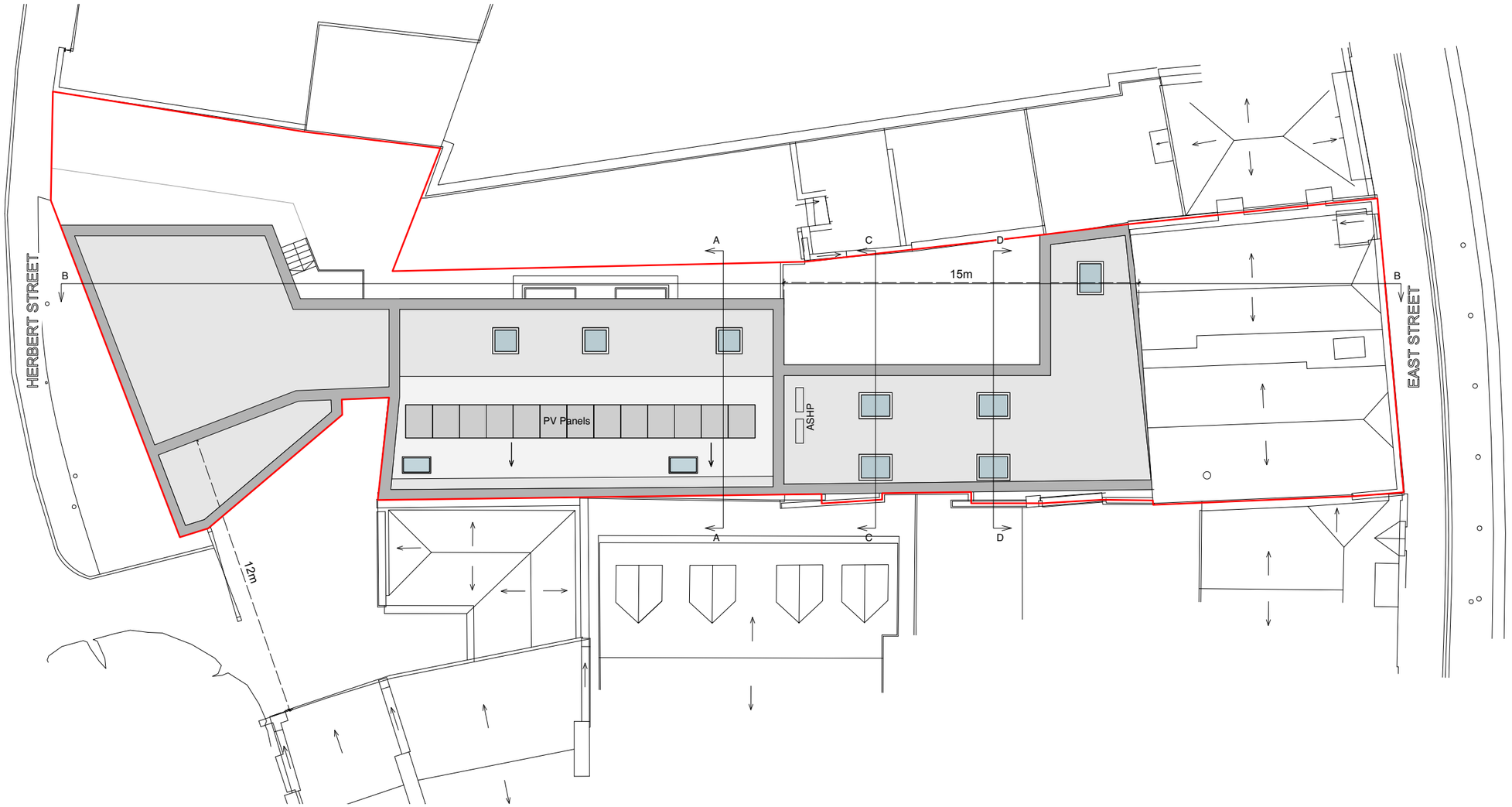
REV.:

STATUS: FINAL

SCALE: 1:100 @ A1

APPENDIX B

Site Proposals



0 5.0 7.5 10.0 12.5 15.0 M

N

REVISION SUMMARY DATE REVISION

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0117 248 2688

Project number: 2124

Project: 110-112 East Street, BS3 4EY

Status: PLANNING

Use figured dimensions only. Only build from drawing marked for 'Construction'.

Drawing Title: PROPOSED Site and Roof Plan

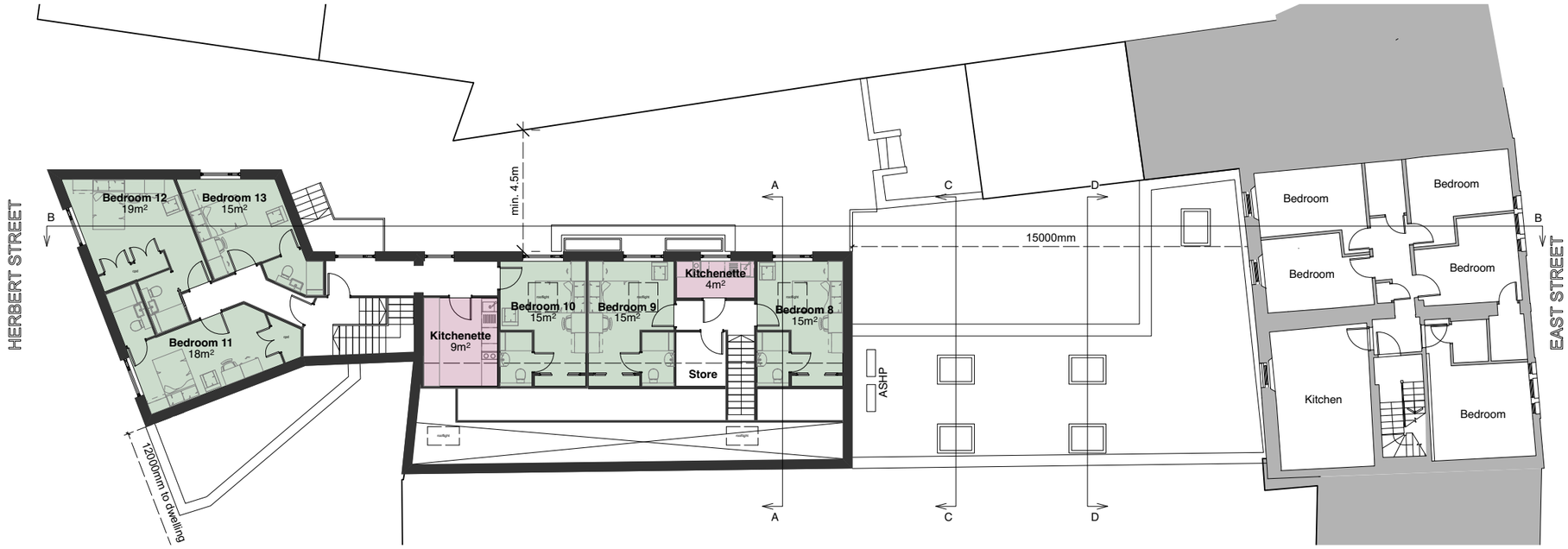
Drawn by: MP

Date: Dec 2024

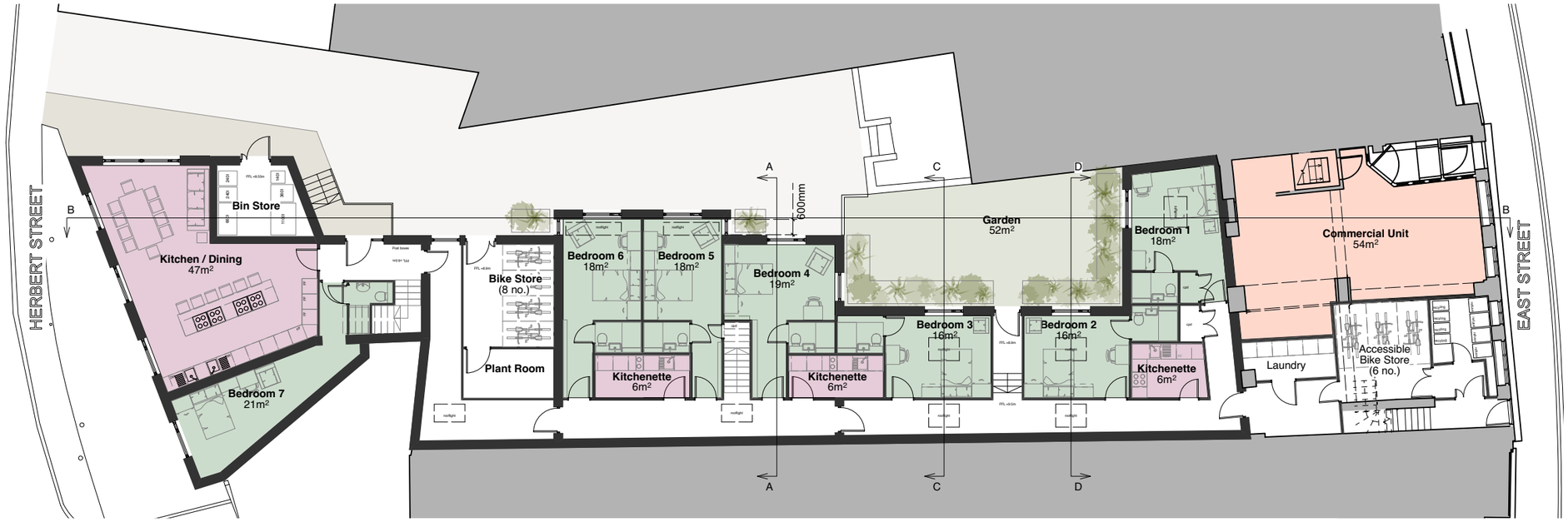
Scale: 1:200@A3 1:100@A1

Drawing number: **213**

Revision: P1



Proposed First Floor Plan



Proposed Ground Floor Plan

0 5.0 7.5 10.0 12.5 15.0 M

N

REVISION SUMMARY | DATE | REVISION

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Project number	Project	Status	Drawing Title	Drawn by	Scale	Drawing number	Revision
2124	110-112 East Street, BS3 4EY	PLANNING Use figured dimensions only. Only build from drawing marked for 'Construction'.	PROPOSED Ground and First Floor Plans	MP Date Dec 2024	1:200@A3 1:100@A1	**211**	P1

Proposed North East Elevation

Notes

1. Bronze finish polyester powder coated coping to parapet
2. Smooth cream render window surrounds with bronze coloured rustication detail. Window surrounds to step proud of brickwork.
3. Dark red brick finish
4. Aluminium windows with bronze powder coated finish. Where shown, windows to include louvred panels.
5. SUDS planters

Proposed North East Elevation & Section BB

0 5.0 7.5 10.0 12.5 15.0 M

REVISION SUMMARY | DATE | REVISION

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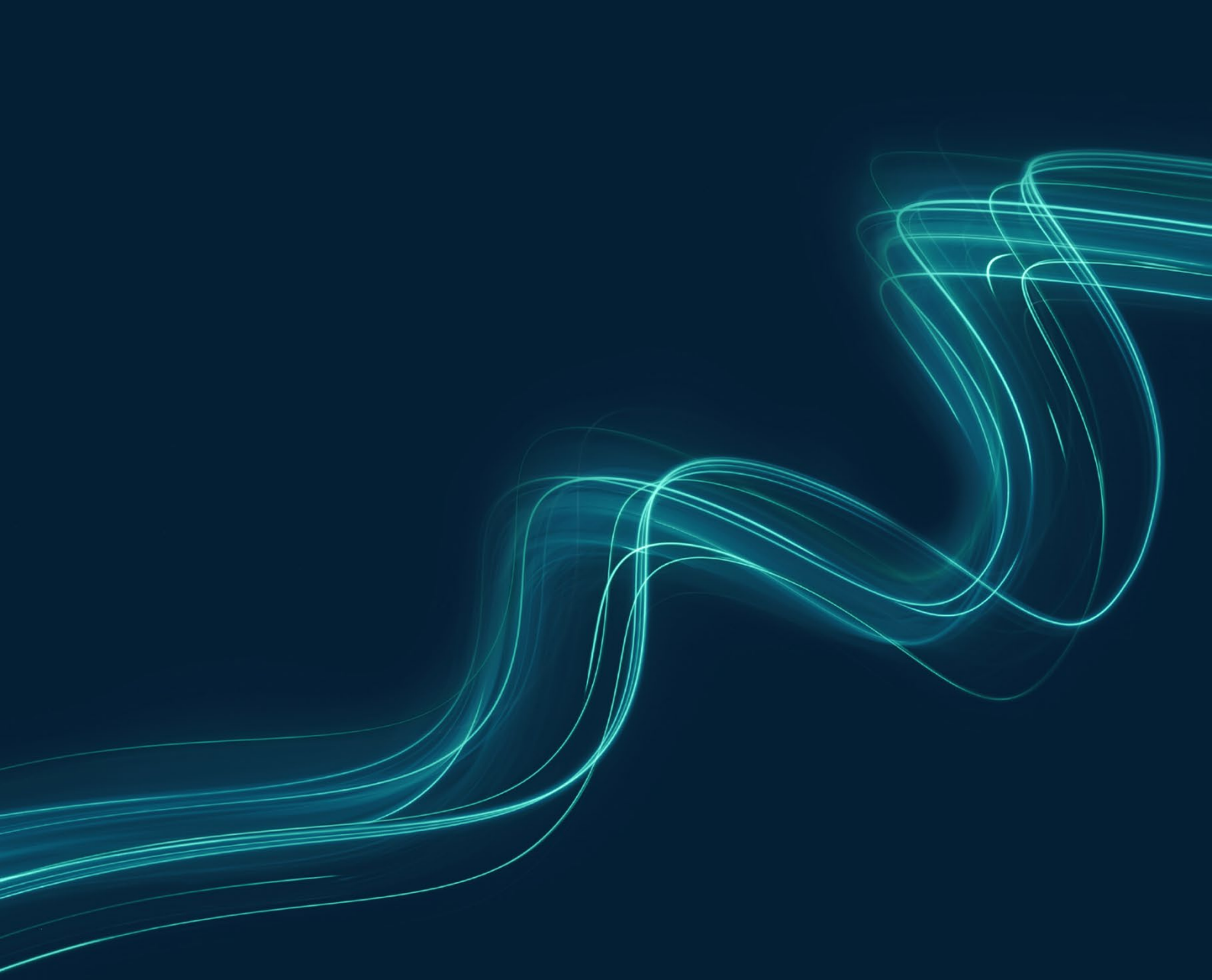
Project number	Project	Status	Drawing Title	Drawn by	Scale	Drawing number	Revision
2124	110-112 East Street, BS3 4EY	PLANNING Use figured dimensions only. Only build from drawing marked for 'Construction'.	PROPOSED North East Elevations & Sections	MP Date Dec 2024	1:200@A3 1:100@A1	**214**	P1



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