

FLOOD RISK ASSESSMENT & SURFACE WATER DRAINAGE STRATEGY

Village Hotel, Bury

Warerfold Business Park, Rochdale Rd, Bury, BL9 7BQ

On behalf of Village Hotel Club

Date: 16/12/2024 | Pegasus Ref: P23-2674 – Author: Arron Tullett/Stephen Drew





Document Management

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1. Introduction

Background

- 1.1. Pegasus Planning Group Ltd has been appointed by Village Hotel Club to undertake a Flood Risk Assessment (FRA) and surface water drainage strategy for a proposed 27-bedroom extension to the existing Village Hotel Bury. The proposals form part of a full planning application.
- 1.2. This assessment considers the risk of flooding from all sources, including tidal, fluvial, surface water, historic, groundwater, sewer, and artificial sources.

National and Local Policies

- 1.3. The National Planning Policy Framework (NPPF) (December 2023) states that a site-specific Flood Risk Assessment (FRA) will be required for proposals:
 - a) that are located in Flood Zone 2 or 3 (all development);
 - b) that are greater than 1 hectare (ha) in area within Flood Zone 1;
 - 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 increased flood risk 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.
- 1.4. The overall site is approximately 3.075ha and the extension area (red line boundary) 0.119ha in area and generally located in Flood Zone 2 and 3. A full FRA is therefore required for the proposals.
- 1.5. The NPPF (December 2023) also highlights the need to incorporate sustainable drainage systems (SuDS) into new developments.
- 1.6. In February 2016, the Environment Agency (EA) introduced new guidance relating to the climate change allowances that must be considered within an FRA. Since 2016, the allowances for sea level rise, peak river flow and peak rainfall have each been updated, with the most recent update occurring in May 2022.
- 1.7. Given the above, any new planning application that requires an FRA will also require a surface water drainage strategy to be submitted. The drainage strategy must demonstrate the use of SuDS within the design and should be in line with the requirements as set out within the NPPF (December 2023). The drainage strategy must also account for climate change over the lifetime of the development, in accordance with the climate change allowances published by the EA.

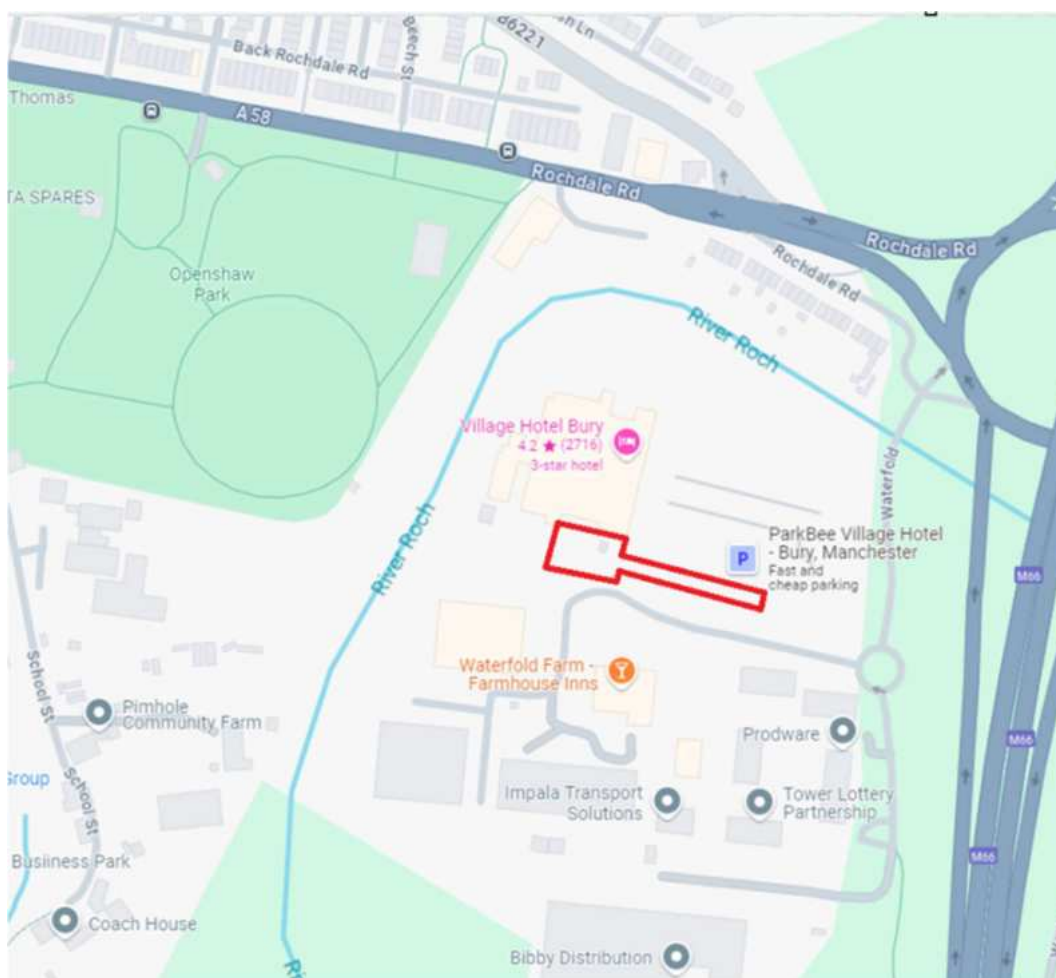
- 1.8. In addition to the requirements from the NPPF and EA, as discussed above, this assessment has also reviewed the information and requirements included in the Rochdale Metropolitan Borough Council Strategic Flood Risk Assessment (January 2012). This is referred to as the "local SFRA (2012)" throughout this report.

2. Existing Site & Hydrology

Site Location & Existing Conditions

- 2.1. The site comprises the existing Village Hotel Bury, Waterfold Business Park, Rochdale Rd, Bury, BL9 7BQ
- 2.2. The site is bordered to the north by River Roch, to the east by the M66, to the south by Roch Viaduct and to the west by Openshaw Park.
- 2.3. The approximate co-ordinates at the centre of the site are E: 381839, N: 410484.
- 2.4. The site location is shown in Figure 2.1.

Figure 2.1 – Site Location



- 2.5. A topographic survey of the site was conducted by West Coast Geomatics in April 2024, a PDF of which is included in **Appendix A**. The topographic survey shows that ground levels on site are relatively flat, ranging from approximately 76mAOD to approximately 74mAOD.

Existing Drainage and Hydrology

- 2.6. There are no Main Rivers or Ordinary Watercourses located on site.
- 2.7. The River Roch flows to the north and western boundary (see Figure 2.1).
- 2.8. Geological data from the British Geological Survey (BGS) shows that the site is underlain by "Pennine Lower Coal Measures Formation – Mudstone, siltstone and sandstone" bedrock geology. BGS also show superficial deposits located at the site comprising "Alluvium, Clay, silt, sand and gravel."
- 2.9. Soils mapping shows the site consists of both "loamy and clayey floodplain soils with naturally high groundwater" and "slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils".
- 2.10. The hydrogeology 625K digital hydrogeological map of the UK shows that the entire site is underlain with a "moderately productive aquifer".
- 2.11. The site is not defined as a Drinking Water Safeguard Zone for either surface water or groundwater and is also not located within a Source Protection Zone.
- 2.12. The site is currently developed and generally comprises concrete hardstanding with areas of soft landscaping generally at the borders.

3. Proposed Development

- 3.1. The site is the erection of a 34-bedroom extension and associated works. The proposed extension sits within the existing car parking area. The additional 34 bedrooms will be provided over three storeys: the ground floor, the first floor and the second floor. The lower ground floor which sits at the current ground level will not include any proposed bedrooms and will comprise of the plant room and stairs.
- 3.2. Details of the proposed development including an existing site plan, proposed site plan, proposed elevations and proposed floor plans are included in **Appendix B**.
- 3.3. Landscaping has also been proposed on site. Details of the proposed landscaping are provided elsewhere in the planning submission documents.

4. Development Vulnerability & Flood Zone Classification

National Planning Policy Framework (NPPF) (December 2023)

- 4.1. Local Planning Authorities, (LPA) have a statutory obligation to consult the Environment Agency (EA) on all applications in the flood zones. The EA will consider the effects of flood risk in accordance with the NPPF.
- 4.2. NPPF requires that, as part of the planning process:
- A 'site specific' Flood Risk Assessment will be undertaken for any site that has a flood risk potential.
 - Flood risk potential is minimised by applying a 'sequential approach' to locating 'vulnerable' development.
 - Sustainable drainage systems are used for surface water management where practical.
 - Flood risk is managed through the use of flood resilient and resistant techniques.
 - Residual risk is identified and safely managed.
 - Safe access and escape routes are included where appropriate.
- 4.3. Table 1 of the 'Flood risk and coastal change' Planning Practice Guidance (PPG) defines each flood zone based on the probability of river and sea flooding in that area, as summarised below:
- Zone 1- Low probability (< 1 in 1000 years).
 - Zone 2- Medium probability (1 in 1000 – 1 in 100 years for fluvial events and 1 in 1000 – 1 in 200 years for tidal events).
 - Zone 3a- High probability (> 1 in 100 years for fluvial events and > 1 in 200 year for tidal events).
 - Zone 3b- The functional floodplain (>1 in 30 years).
- 4.4. The flood risk and coastal change PPG sets out a matrix indicating the types of development that are acceptable in different Flood Zones (see Table 4.1). The proposals are for a hotel extension which is classified as 'More Vulnerable'. The proposed hotel extension is located in Flood Zone 2. More Vulnerable development is appropriate in Flood Zone 2 (see Table 4.1).

Table 4.1 – Flood Risk & Vulnerability Guidance

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

Sequential Test

- 4.5. According to the “Flood risk and coastal change” Planning Practice Guidance (PPG), “the Sequential Test should be applied to ‘Major’ and ‘Non-major development’ proposed in areas at risk of flooding”. The PPG states that the Sequential Test is intended to “steer new development to areas with the lowest risk of flooding, taking all sources of flood risk and climate change into account”.
- 4.6. Flood risk from all sources is assessed in detail in Section 5. The conclusions of this assessment are that the site is at Very Low to Low risk of flooding from all sources.
- 4.7. It is also noted that as the proposals are for an extension to an existing hotel, that it would not be possible to locate the development at an alternative site. The proposals are intrinsically linked to the existing site location.
- 4.8. Based on the above, a Sequential Test is not considered necessary for the site.

Exception Test

- 4.9. The Exception Test is not required for More Vulnerable development in Flood Zone 2 (see Table 4.1).

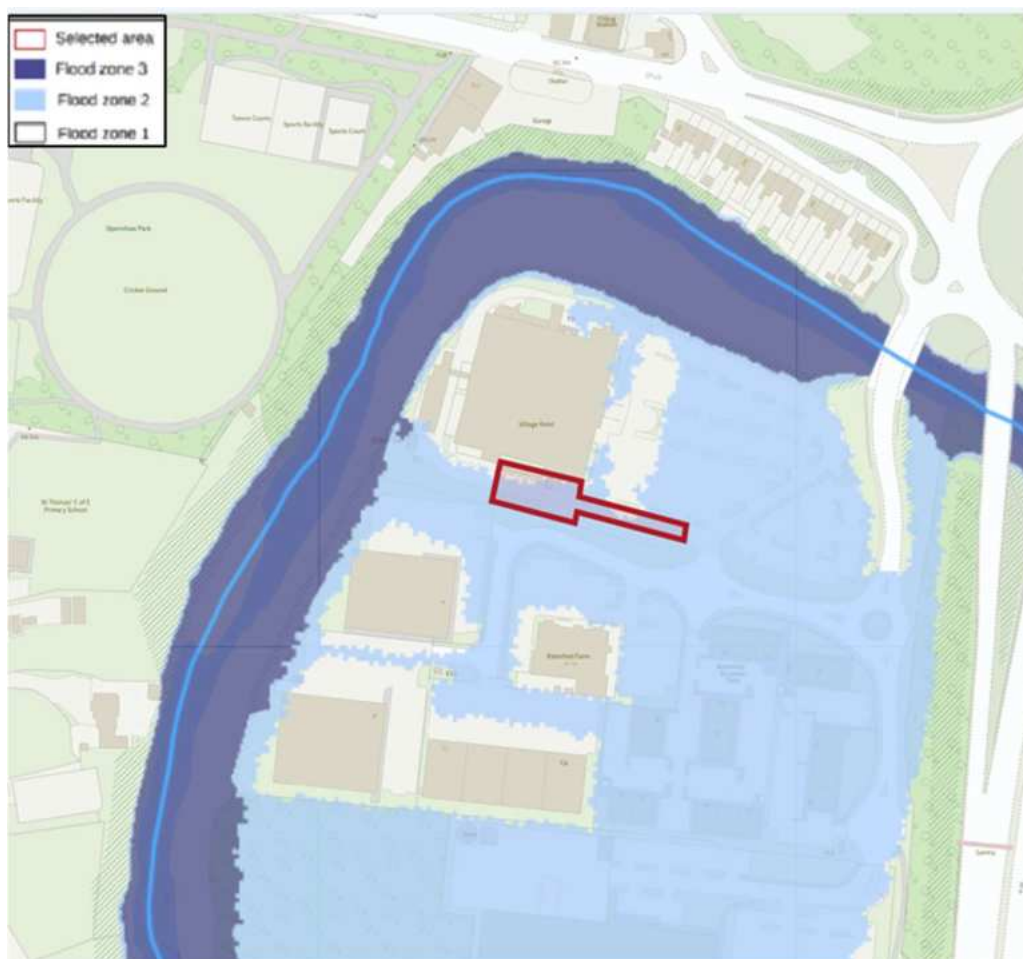
5. Site Specific Flooding Issues and Existing Flood Records

National Planning Policy Framework (NPPF)

- 5.1. In accordance with the NPPF (December 2023), this Flood Risk Assessment considers all sources of flooding including:
- a) Tidal Flooding – from the sea;
 - b) Fluvial Flooding – from rivers and streams;
 - c) Surface Water Flooding – from overland surface water flow and exceedance;
 - d) Historic Flooding – known historic flooding issues;
 - e) Groundwater Flooding – from elevated groundwater levels or springs;
 - f) Flooding from Sewers – exceedance flows from existing sewer systems; and
 - g) Artificial Sources – reservoirs, canals etc.

Tidal Flooding

- 5.2. The Flood Map for Planning defines the village hotel as Flood Zone 1, as shown in Figure 5.1. The proposed extension is located in Flood Zone 2.
- 5.3. Based on the above, the flood risk on site defined by the Flood Map for Planning is considered to be reflective of both fluvial and tidal flood risk. The site is therefore predicted to be impacted by a 1 in 200 year tidal flood event.
- 5.4. At the time of writing, flood model data from the Environment Agency has not been reviewed. An assessment of the modelled tidal flood levels on site has therefore not been conducted. Despite this, it is noted that the proposed extension does not include any proposed bedrooms at the existing ground level (referred to as the lower ground floor in the proposed plans included in **Appendix B**). At the lower ground floor, the proposals comprise of the plant room and stairs.
- 5.5. Based on the above, the proposed plant room and stairs proposed on the lower ground floor may be at risk of tidal flooding. To ensure the proposed development remains safe and operational over its lifetime, flood risk mitigation measures should be implemented on site. These measures are likely to include installing flood resistant and resilient materials on site. Flood risk mitigation measures on site are to be confirmed during detailed design.
- 5.6. Overall, by ensuring all proposed bedrooms are not located on the lower ground floor and by implementing flood risk mitigation measures on site, the proposed development is considered to be at **Low** risk of tidal flooding.



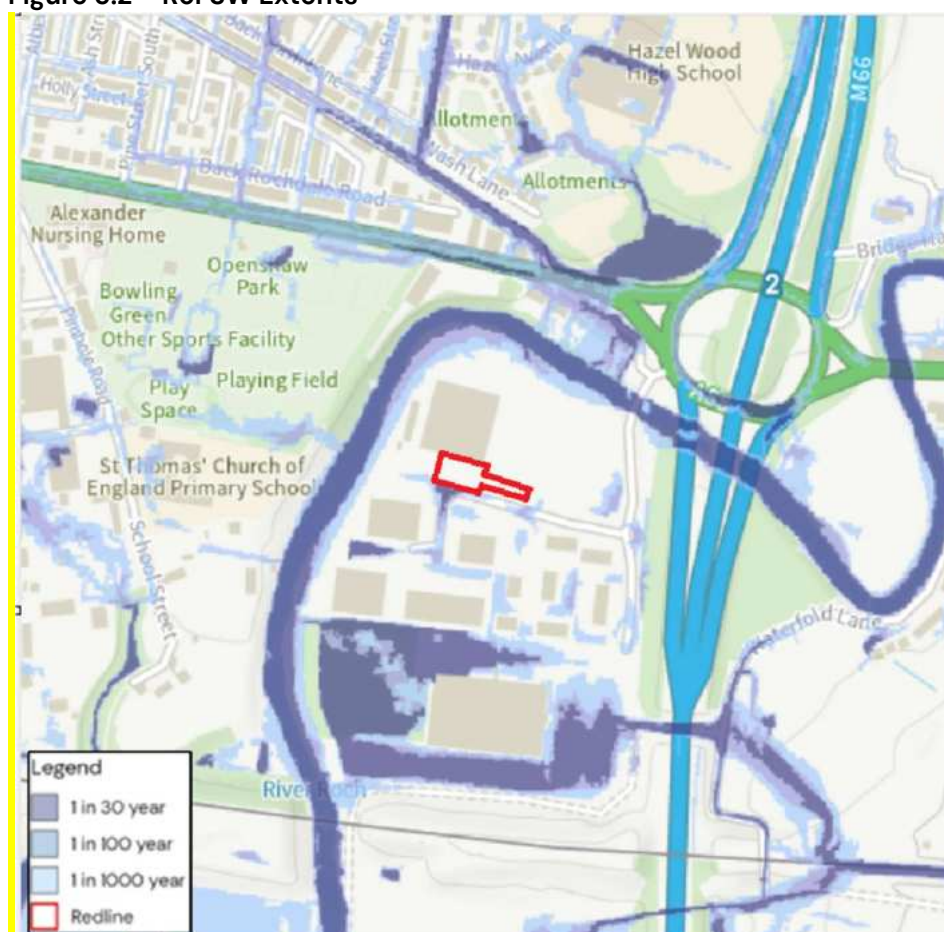
Fluvial Flooding

- 5.7. As mentioned above, the Flood Map for Planning defines the vast majority of the site, including the proposed hotel extension location, as Flood Zone 2 (see Figure 5.1). This risk is considered to be reflective of the fluvial and tidal flood risk associated with the River Roch which flows to the north and west of the site.
- 5.8. The tidally influenced flood risk associated with the River Roch is discussed above.
- 5.9. Trisk of direct fluvial flooding at the site is considered to be **Very Low**.
- 5.10. In addition to the River Roch, there are no further watercourses identified on site or in the immediate vicinity that may pose a risk to the proposed hotel extension.
- 5.11. There are no known historic fluvial flood events impacting the site.
- 5.12. Overall, the risk of fluvial flooding at the site is considered to be **Very Low**.

Surface Water Flooding

- 5.13. The Risk of Flooding from Surface Water (RoFSW) dataset shows that the proposed extension location is at Very Low risk of surface water flooding, not predicted to be impacted by a 1 in 1,000 year rainfall event. The RoFSW extents data is shown in Figure 5.2.
- 5.14. The local SFRA (2012) states that “significant surface water flow paths and pooled areas can be identified in Water Street”. The site location is therefore not highlighted in the local SFRA (2012) as being at significant surface water flood risk.
- 5.15. As discussed above, there are no proposed bedrooms on the lower ground floor. The bedrooms will therefore not be at risk of surface water flooding. The risk to the plant room and stairs proposed on the lower ground floor is also considered to be negligible, based on the evidence discussed above.
- 5.16. The proposed development will not increase surface water runoff rates from the site and will therefore not increase surface water flood risk on site or elsewhere. This is ensured by the proposed surface water drainage strategy which is presented in Section 6.
- 5.17. Based on the above, the site is considered to be at **Very Low** risk of flooding from surface water.

Figure 5.2 – RoFSW Extents



Groundwater Flooding

- 5.18. The hydrogeology 625K digital hydrogeological map of the UK shows that the entire site is underlain with a “highly productive aquifer”. BGS shows that the site is underlain by sandstone bedrock geology. There is potential for groundwater emergence where a highly productive aquifer is overlain by sandstone bedrock. The site is however generally comprised of developed hardstanding areas that will significantly reduce the potential for groundwater emergence on site. In addition, clayey soils and superficial deposits recorded on site will further inhibit groundwater emergence on site.
- 5.19. The local SFRA (2011) does not highlight the site location as being an area of identified groundwater flood risk. The SFRA also states that “unless an area identified as ‘susceptible to groundwater flooding’ is also identified as ‘at risk from surface water flooding’, it is unlikely that this location would actually experience groundwater flooding to any appreciable depth, and therefore it is unlikely that the consequences of such flooding would be significant”. As discussed above, the site is considered to be at Very Low risk of surface water flooding and is therefore also not considered to be at notable risk of groundwater flooding.
- 5.20. Overall, the risk of groundwater flooding at the site is considered to be **Very Low**.

Flooding from Sewers

- 5.21. Any sewer flood waters on or around the site would follow local topography and would be expected to drain to the local watercourses, such as the River Roch, without accumulating to significant depths on site or in the immediate vicinity.
- 5.22. The proposed surface water drainage strategy (see Section 6) will ensure the development’s impact on existing surface water sewers is managed.
- 5.23. The risk of flooding from sewers to the site is therefore considered to be **Low**.

Flooding from Artificial Sources

- 5.24. The EA’s Reservoir Flood Extents data shows that the site that is not predicted to be at risk of reservoir flooding should a catastrophic breach occur during a dry day, when local rivers are flowing under normal conditions. The site is however predicted to be at risk during a wet day when local watercourses have already overtopped their banks (see Figure 5.4).
- 5.25. There are no other artificial sources of flooding identified that may pose a risk to the site.
- 5.26. Overall the site is considered to be at **Low** risk of flooding from artificial sources.

Figure 5.4 – Reservoir Flood Extents



Access & Egress

- 5.27. Access to the proposed hotel extension will be via the exiting access off Centre Park Square.
- 5.28. As with the proposed extension, the proposed access is not considered to be at significant flood risk from any source.
- 5.29.

Post Development Flood Risk Summary

- 5.30. The risk of flooding to the site from all sources has been assessed above, with the conclusions summarised in Table 5.1.

Table 5.1 – Flood Risk Summary

Flood Source	Flood Risk	Mitigation/Comments
Tidal	Low	• Despite being located in Flood Zone 2, the site is considered to be at Low risk of tidal flooding given that all proposed bedrooms are located on the ground floor, not the lower ground floor which is located at the existing ground level. • Flood risk mitigation measures will be proposed on site to ensure the site remains safe and operational during a potential tidal flood event. These mitigation measures will be confirmed during detailed design.
Fluvial	Very Low	• The River Roch is the only watercourse identified in the immediate vicinity of the site that could post a risk to the site and there are no watercourses identified within the redline. • There are no known historic fluvial flood events having occurred on site.
Surface Water	Very Low	• The RoFSW dataset does not predict the proposed extension location to be at risk during a 1 in 1,000 year rainfall event. • The local SFRA (2011) does not highlight the site location as being at significant risk of surface water flooding. • There are no proposed bedrooms located on the lower ground floor. • Surface water arising within the site boundary will be managed with the proposed surface water drainage strategy
Historic	Very Low	• No historic flooding is recorded by the EA within the site boundary. • There are no known records of historic flood events impacting the site.

Groundwater	Very Low	• The areas of developed hardstanding on site and the clayey soils and superficial deposits present will significantly reduce the risk of groundwater flooding on site. • The site is not predicted to be at risk of surface water flooding, any groundwater to emerge on site would therefore not be predicted to accumulate to significant depths.
Sewers	Low	• There are no records of historic sewer flooding impacting the site itself. • Sewer flood waters will follow local topography and flow into surrounding watercourses. • The proposed surface water drainage strategy will ensure the development's impact on existing surface water drainage sewers is managed.
Artificial	Low	• The risks from canals and reservoirs is considered to be residual and there are no known historic artificial flood events impacting the site.

6. Proposed Surface Water Drainage Strategy

- 6.1. The site proposals will alter the existing drainage network of the hotel. Therefore, a drainage strategy is required.
- 6.2. The design drawings of the existing network are shown in **Appendix C**. The proposed drainage network, including impermeable area, can be found in **Appendix D**.
- 6.3. Existing and proposed storm calculations can be seen in **Appendix E**.

Changes to the Site

- 6.4. The proposed extension of the hotel is located on the existing building's car park.
- 6.5. Due to this, the impermeable area of the site will not change significantly other than slight changes to the soft landscaping.
- 6.6. The impermeable areas of both the existing and the proposed site have therefore been calculated to determine the difference (See **Appendix D**), the areas shown are just within the vicinity of the proposed extension with calculations as follows:
 - The existing impermeable area in the location of the proposed hotel extension is 935m².
 - The proposed impermeable area in the location of the proposed hotel extension is 1190m².
- 6.7. The change in impermeable hardstanding within the site boundary will increase the surface water runoff from the site. Although this has increased, the flow will be reduced to what is currently existing to 1 l/s and the proposal of permeable paving into new parking areas. It is therefore proposed to direct surface water runoff from the extension area to the existing surface water drainage system. It is expected that the proposed extension will have no effect on the surface water system.

Drainage Network Rerouting

- 6.8. As it has been determined that there is a increase in impermeable area on site, the general drainage strategy principles do not need to be altered.
- 6.9. However, foundations and excavations will be required within the area of the extension.
- 6.10. Therefore, the drainage network needs to be rerouted around the new development proposals.
- 6.11. Fortunately, there is little overlap between the existing network and the proposed extension. Only a singular storm pipe and two gullies will need to be removed from the car park in the location of the proposed extension and have their position altered to suit the through road at lower ground level of the extension.

- 6.12. The drainage strategy therefore proposes to divert this pipe and alter the position of two gullies into the new hardstanding road that covers the lower ground floor of the new extension. This will collect any residual surface water that is travelling toward it and is then connected to the new diverted surface water drain.

7. Summary

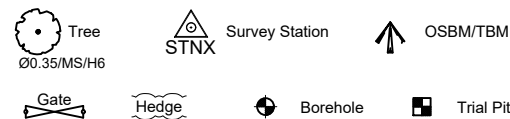
- 7.1. The proposed development is for “erection of a 34-bedroom extension provided over 3 storeys”, ground, first and second floors. The lower ground floor which sits at the current ground level will not include any proposed bedrooms and will comprise of the plant room and stairs and will also include the reconfiguration of the existing car park, landscaping, and associated works”.
- 7.2. The site is located in Flood Zone 2, at Low risk of flooding from rivers and the sea. The site is considered to be at Low to Very low risk of flooding from all sources.
- 7.3. The Lower Ground Floor of the extension does not include any bedrooms only plant rooms and stairs so there will be a low impact due to being in Flood Zone 2.
- 7.4. Site access and egress is not predicted to be impacted during an extreme flood event.
- 7.5. The proposals show an increase in the impermeable area of the site but with the proposal of flow restriction and SUDs, the existing drainage network will be affected by the proposals and has been replicated around the construction area in order to avoid the foundations and other structural features.
- 7.6. The proposal is considered to accord with the requirements of the National Planning Policy Framework (NPPF) with residual risk to the site fully mitigated, and as such considered low risk. The proposed development will also not increase flood risk elsewhere.



Appendix A – Topographical Survey

Abbreviations where applicable:			
CL	Ceiling Level	UB	Under Beam
DH	Door Height	UJ	Under Jois
FCL	False Ceiling Level	UP	Under Pipe
FL	Floor Level	WH	Wall Height

General Legend:



Sheet Layout:

A2

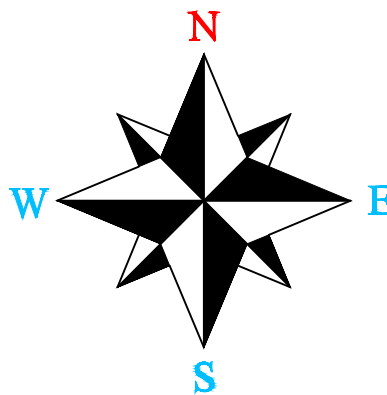
This drawing is to be read in conjunction with:

WCG 24-2105-T	[Topographical Survey]
WCG 24-2105-IMS-UGF	[Upper Ground Floor Internal Measured Survey]
WCG 24-2105-IMS-1F	[First Floor Internal Measured Survey]
WCG 24-2105-IMS-2F	[Second Floor Internal Measured Survey]
WCG 24-2105-ELV	[Elevation Survey]

Survey Control:

	-E/X-	-N/Y-	-Ht/Z-
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Relative to Ordnance Survey grid via Active Network RTK GPS
Plane Table Grid



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Drawing Title:

Ground Floor

Site Address / Project Reference:

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Bury - BL9 7BQ

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WCG 24-2105-T	[Topographical Survey]
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Checked & QA:	SN	Date of Issue	April 2024





Abbreviations where applicable:

CL	Ceiling Level	UB	Under Beam
DH	Door Height	UJ	Under Joist
FCL	False Ceiling Level	UP	Under Pipe
FL	Floor Level	WH	Wall Height

General Legend:

Tree	Survey Station	OSBM/TBM
Gate	Hedge	Borehole
		Trial Pit

Sheet Layout:

A2

This drawing is to be read in conjunction with:

WCG 24-2105-T	[Topographical Survey]
WCG 24-2105-IMS-GF	[Ground Floor Internal Measured Survey]
WCG 24-2105-IMS-UGF	[Upper Ground Floor Internal Measured Survey]
WCG 24-2105-IMS-2F	[Second Floor Internal Measured Survey]
WCG 24-2105-ELV	[Elevation Survey]

Survey Control:

	-E/X-	-N/Y-	-Ht/Z-
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STN2	381819.397	410441.967	75.170
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STN8B	381839.943	410457.041	79.063
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Client:

Pegasus Group

Drawing Title:

First Floor

Site Address / Project Reference:

Village Hotel Bury
Waterfold Business Park - Rochdale Road
Bury - BL9 7BQ

Surveyed: NF/JJD Document No. WCG 24-2105-IMS-1F-1:1
Processed: RM Plotted Scale: ISO_A2_@_1:50
Checked & QA: SN Date of Issue: April 2024

Abbreviations where applicable:

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General Legend:

	Tree		Survey Station		OSBM/TBM
	Gate		Borehole		Trial Pit

Sheet Layout:

A2

This drawing is to be read in conjunction with:

WCG 24-2105-T	[Topographical Survey]
WCG 24-2105-IMS-GF	[Ground Floor Internal Measured Survey]
WCG 24-2105-IMS-UGF	[Upper Ground Floor Internal Measured Survey]
WCG 24-2105-IMS-1F	[First Floor Internal Measured Survey]
WCG 24-2105-ELV	[Elevation Survey]

Survey Control:

	-E/X-	-N/Y-	-Ht/Z-
STN1	381908.751	410427.714	75.693
STN2	381819.397	410441.967	75.170
STN3	381770.379	410462.350	75.212
STN4	381783.032	410516.173	75.355
STN5	381806.982	410540.138	75.440
STN6	381841.731	410532.644	75.479
STN7	381866.218	410513.819	75.436
STN8	381947.463	410482.988	75.384
STN8A	381850.038	410489.990	79.030
STN8B	381839.943	410457.041	79.063
STN9	381950.574	410438.753	75.053

Relative to Ordnance Survey grid via Active Network RTK GPS
Plane Table Grid

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GEOMATICS
LAND & MEASURED BUILDING SURVEYORS

Address:

Suites 3 & 4 Orchard House
Halsall Business Centre
Lancashire
L39 8RG

Contact details:

Tel [Land]: +44 [0] 1704 840 938
Email: info@wcgeo.co.uk
Web: www.wcgeo.co.uk

Client:

Pegasus Group

Drawing Title:

Second Floor

Site Address / Project Reference:

Village Hotel Bury
Waterfold Business Park - Rochdale Road
Bury - BL9 7BQ

Surveyed: NF/JJD Document No. WCG 24-2105-IMS-2F-1:1
Processed: RM Plotted Scale: ISO_A2_@_1:50
Checked & QA: SN Date of Issue: April 2024





Elevation A-A

Abbreviations where applicable:

CL	Ceiling Level	UB	Under Beam
DH	Door Height	UJ	Under Joist
FCL	False Ceiling Level	UP	Under Pipe
FL	Floor Level	WH	Wall Height

General Legend:

	Tree		Survey Station		OSBM/TBM
	Gate		Hedge		Borehole
			Trial Pit		

Sheet Layout:

A2

This drawing is to be read in conjunction with:

WCG 24-2105-T	[Topographical Survey]
WCG 24-2105-IMS-GF	[Ground Floor Internal Measured Survey]
WCG 24-2105-IMS-UGF	[Upper Ground Floor Internal Measured Survey]
WCG 24-2105-IMS-1F	[First Floor Internal Measured Survey]
WCG 24-2105-IMS-2F	[Second Floor Internal Measured Survey]

Survey Control:

	-E/X-	-N/Y-	-Hi/Z-
STN1	381908.751	410427.714	75.693
STN2	381819.397	410441.967	75.170
STN3	381770.379	410462.350	75.212
STN4	381783.032	410516.173	75.355
STN5	381806.982	410540.138	75.440
STN6	381841.731	410532.644	75.479
STN7	381866.218	410513.819	75.436
STN8	381947.463	410482.988	75.384
STN8A	381850.038	410489.990	79.030
STN8B	381839.943	410457.041	79.063
STN9	381950.574	410438.753	75.053

Relative to Ordnance Survey grid via Active Network RTK GPS
Plane Table Grid

Amendments:

Rev:	Description
-	

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Halsall Business Centre
Lancashire
L39 8RG

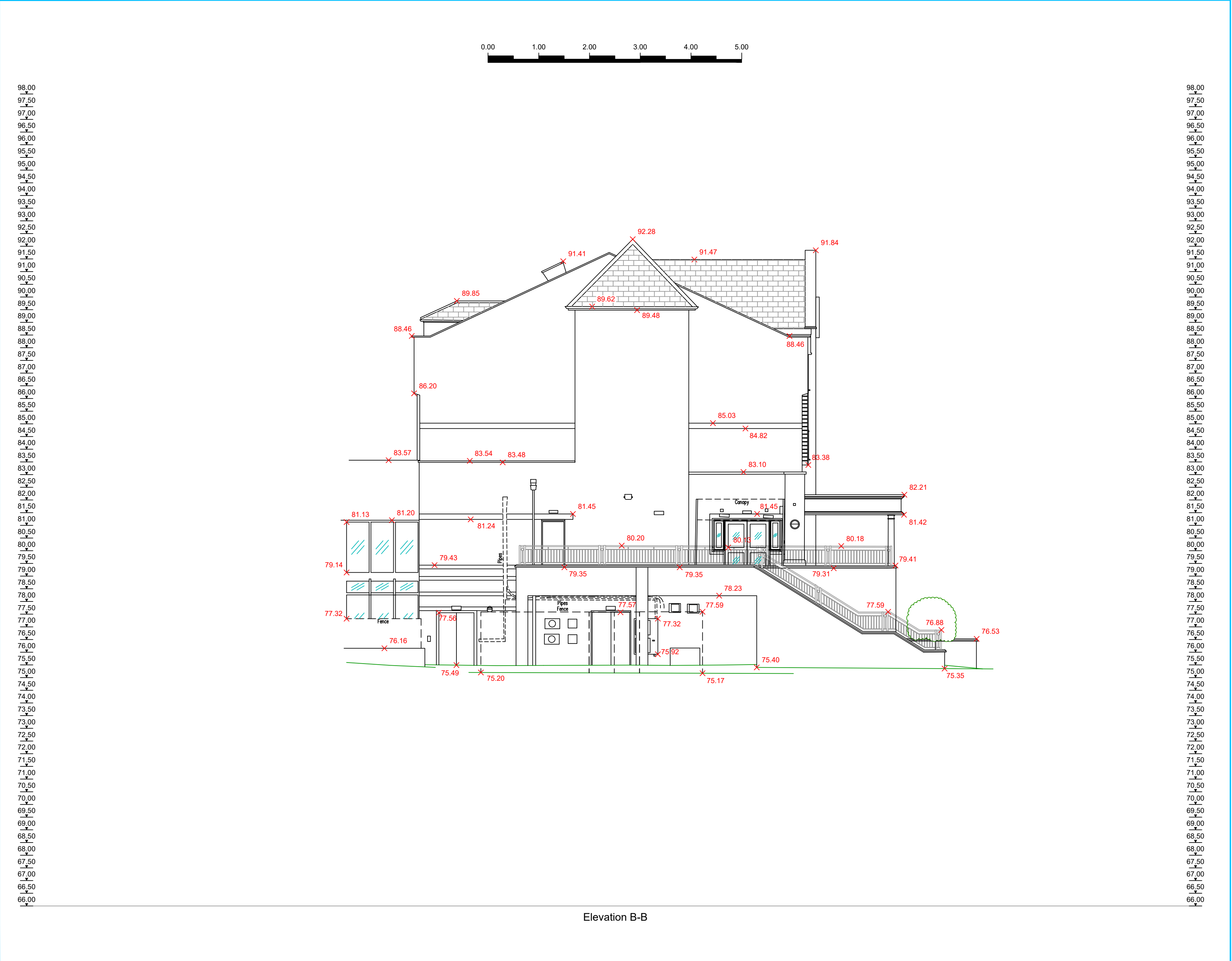
Contact details: Tel [Land]: +44 [0] 1704 840 938
Email: info@wcgeo.co.uk
Web: www.wcgeo.co.uk

Client: Pegasus Group

Drawing Title: Elevation Survey Sheet 1 of 3

Site Address / Project Reference: Village Hotel Bury
Waterfold Business Park - Rochdale Road
Bury - BL9 7BQ

Surveyed:	NF/JJD	Document No.	WCG 24-2105-IMS-ELV-1:3
Processed:	RM	Plotted Scale:	ISO_A2_@_1:50
Checked & QA:	SN	Date of Issue	April 2024



Elevation B-B

Abbreviations where applicable:

CL	Ceiling Level	UB	Under Beam
DH	Door Height	UJ	Under Jois
FCL	False Ceiling Level	UP	Under Pipe
FL	Floor Level	WH	Wall Height

General Legend:

	Tree		Survey Station		OSBM/TBM
	Gate		Hedge		Borehole
			Trial Pit		

Sheet Layout:

A2

This drawing is to be read in conjunction with:

WCG 24-2105-T	[Topographical Survey]
WCG 24-2105-IMS-GF	[Ground Floor Internal Measured Survey]
WCG 24-2105-IMS-UGF	[Upper Ground Floor Internal Measured Survey]
WCG 24-2105-IMS-1F	[First Floor Internal Measured Survey]
WCG 24-2105-IMS-2F	[Second Floor Internal Measured Survey]

Survey Control:

	-E/X-	-N/Y-	-Hi/Z-
STN1	381908.751	410427.714	75.693
STN2	381819.397	410441.967	75.170
STN3	381770.379	410462.350	75.212
STN4	381783.032	410516.173	75.355
STN5	381806.982	410540.138	75.440
STN6	381841.731	410532.644	75.479
STN7	381866.218	410513.819	75.436
STN8	381947.463	410482.988	75.384
STN8A	381850.038	410489.990	79.030
STN8B	381839.943	410457.041	79.063
STN9	381950.574	410438.753	75.053

Relative to Ordnance Survey grid via Active Network RTK GPS Plane Table Grid

Amendments:

Rev	Description
-	

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LAND & MEASURED BUILDING SURVEYORS

Address: Suites 3 & 4 Orchard House
Halsall Business Centre
Lancashire
L39 8RG

Contact details:
Tel [Land]: +44 [0] 1704 840 938
Email: info@wcgeo.co.uk
Web: www.wcgeo.co.uk

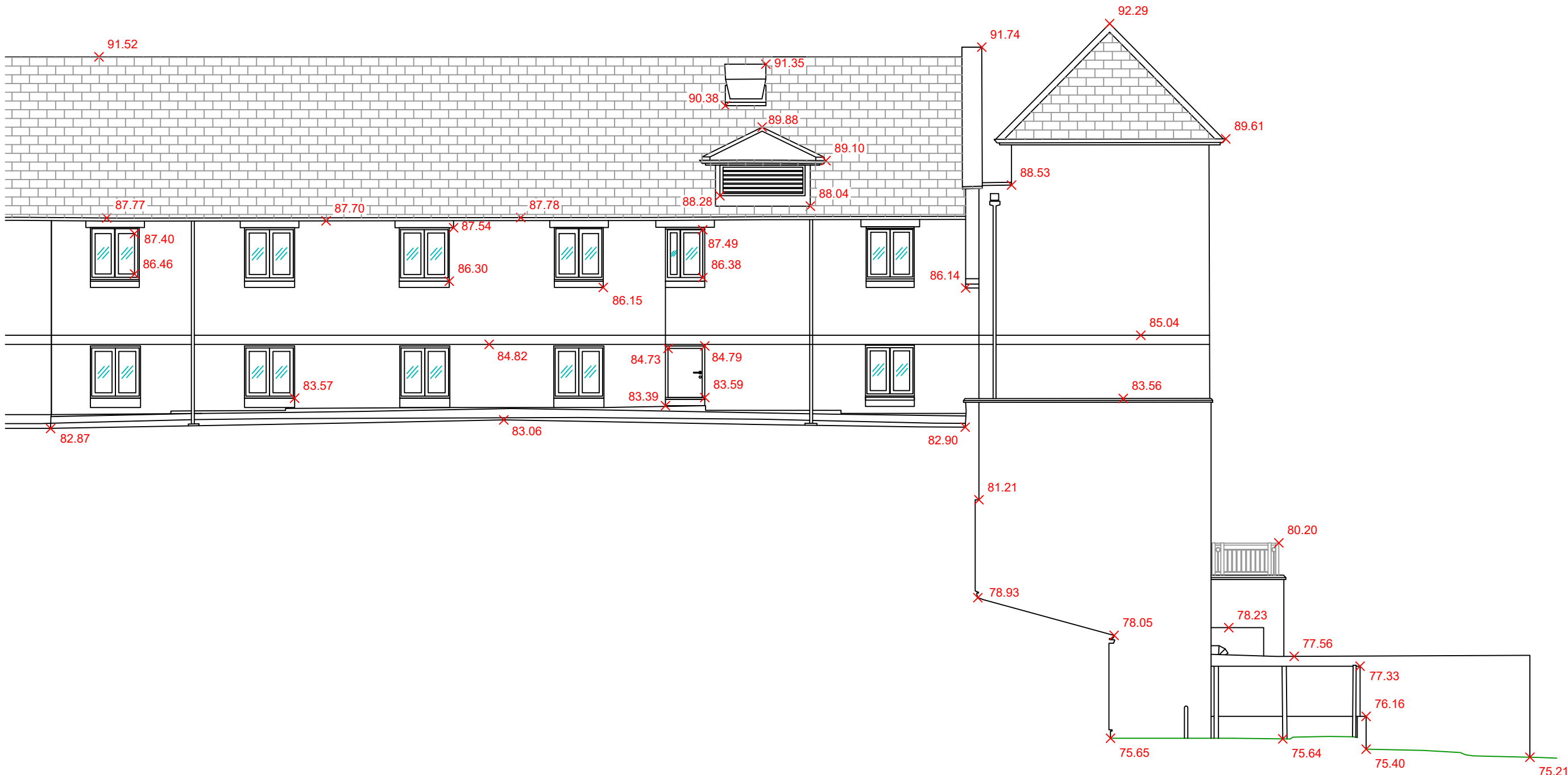
Client:
Pegasus Group

Drawing Title:
Elevation Survey Sheet 2 of 3

Site Address / Project Reference:
**Village Hotel Bury
Waterfold Business Park - Rochdale Road
Bury - BL9 7BQ**

Surveyed:	NF/JJD	Document No.	WCG 24-2105-IMS-ELV-2-3
Processed:	RM	Plotted Scale:	ISO_A2_@_1:50
Checked & QA:	SN	Date of Issue	April 2024

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66.00



Elevation C-C

Abbreviations where applicable:

CL	Ceiling Level	UB	Under Beam
DH	Door Height	UJ	Under Jois
FCL	False Ceiling Level	UP	Under Pipe
FL	Floor Level	WH	Wall Height

General Legend:

	Tree		Survey Station		OSBM/TBM
	Gate		Hedge		Borehole
			Trial Pit		

Sheet Layout:

A2

This drawing is to be read in conjunction with:

WCG 24-2105-T	[Topographical Survey]
WCG 24-2105-IMS-GF	[Ground Floor Internal Measured Survey]
WCG 24-2105-IMS-UGF	[Upper Ground Floor Internal Measured Survey]
WCG 24-2105-IMS-1F	[First Floor Internal Measured Survey]
WCG 24-2105-IMS-2F	[Second Floor Internal Measured Survey]

Survey Control:

	-E/X-	-N/Y-	-Hi/Z-
STN1	381908.751	410427.714	75.693
STN2	381819.397	410441.967	75.170
STN3	381770.379	410462.350	75.212
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STN8	381947.463	410482.988	75.384
STN8A	381850.038	410489.990	79.030
STN8B	381839.943	410457.041	79.063
STN9	381950.574	410438.753	75.053

Relative to Ordnance Survey grid via Active Network RTK GPS Plane Table Grid

Amendments:

Rev	Description
-----	-------------

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Lancashire
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Contact details:
Tel [Land]: +44 [0] 1704 840 938
Email: info@wcgeo.co.uk
Web: www.wcgeo.co.uk

Client:
Pegasus Group

Drawing Title:
Elevation Survey Sheet 3 of 3

Site Address / Project Reference:
**Village Hotel Bury
Waterfold Business Park - Rochdale Road
Bury - BL9 7BQ**

Surveyed: NF/JJD Document No. WCG 24-2105-IMS-ELV-3:3
Processed: RM Plotted Scale: ISO_A2@_1:50
Checked & QA: SN Date of Issue April 2024



Appendix B – Proposed Development Plans

All dimensions and levels are to be checked on site.

Any discrepancies are to be reported to Cube Architecture and Design before any work commences.

This drawing shall not be scaled to ascertain any dimensions. Work to figured dimensions only.

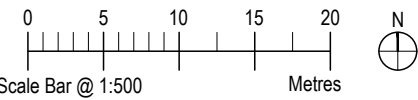
Title overlay drawings and ownership boundaries are produced using all reasonable endeavours.

The existing information, on which this drawing is based, is taken from the Topographical Survey provided by the client (The Hollins Murray Group) in the email dated 10th June 2024.

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Rev	Description	Date	By
-----	-------------	------	----

Status:
Planning

Client:
Village Hotel Club

Contract:
Proposed Extension
Village Hotel, Waterford Business Park
Bury, BL9 7BQ

Drawing:
Site Plan
As Existing

Drawing No: AS863 01	Revision:	Scales: 1:500 @ A1
Drawn: rnc	Checked:	Date: June '24

All dimensions and levels are to be checked on site.

Any discrepancies are to be reported to Cube Architecture and Design before any work commences.

This drawing shall not be scaled to ascertain any dimensions. Work to figured dimensions only.

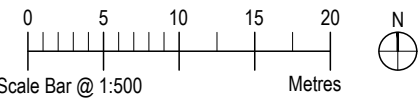
Title overlay drawings and ownership boundaries are produced using all reasonable endeavours.

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P2	Blue line boundary added	18.10.24
P1	Car parking layout revised as existing	08.10.24

Rev	Description	Date	By
-----	-------------	------	----

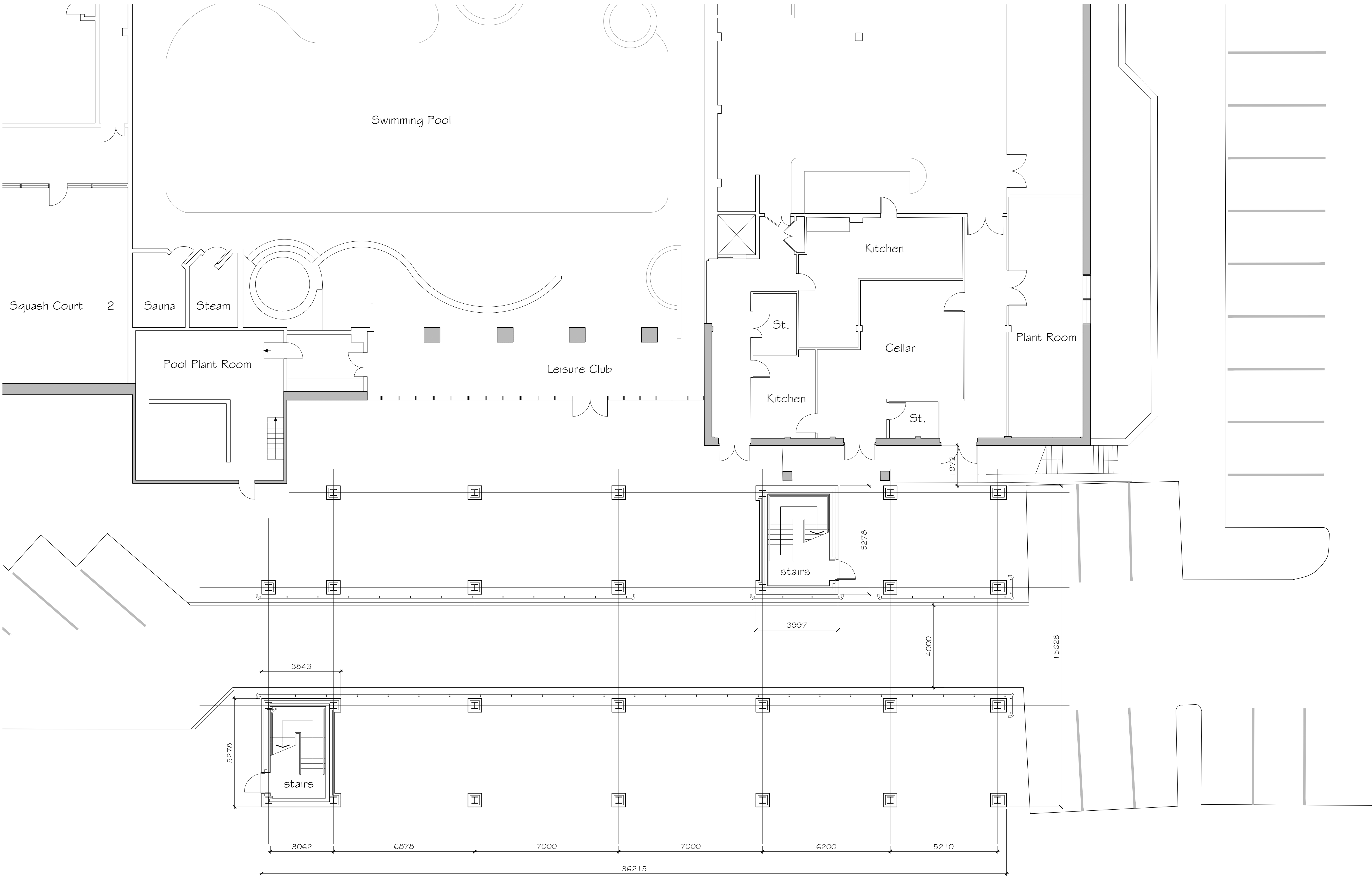
Status:
Planning

Client:
Village Hotel Club

Contract:
Proposed Extension
Village Hotel, Waterford Business Park
Bury, BL9 7BQ

Drawing:
Site Plan
As Proposed

Drawing No: AS863 07	Revision: P2	Scales: 1:500 @ A1
Drawn: rmc	Checked:	Date: August '24



All dimensions and levels are to be checked on site.

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P1	Drawing progressed for planning	16.10.24	rnc
Rev	Description	Date	By

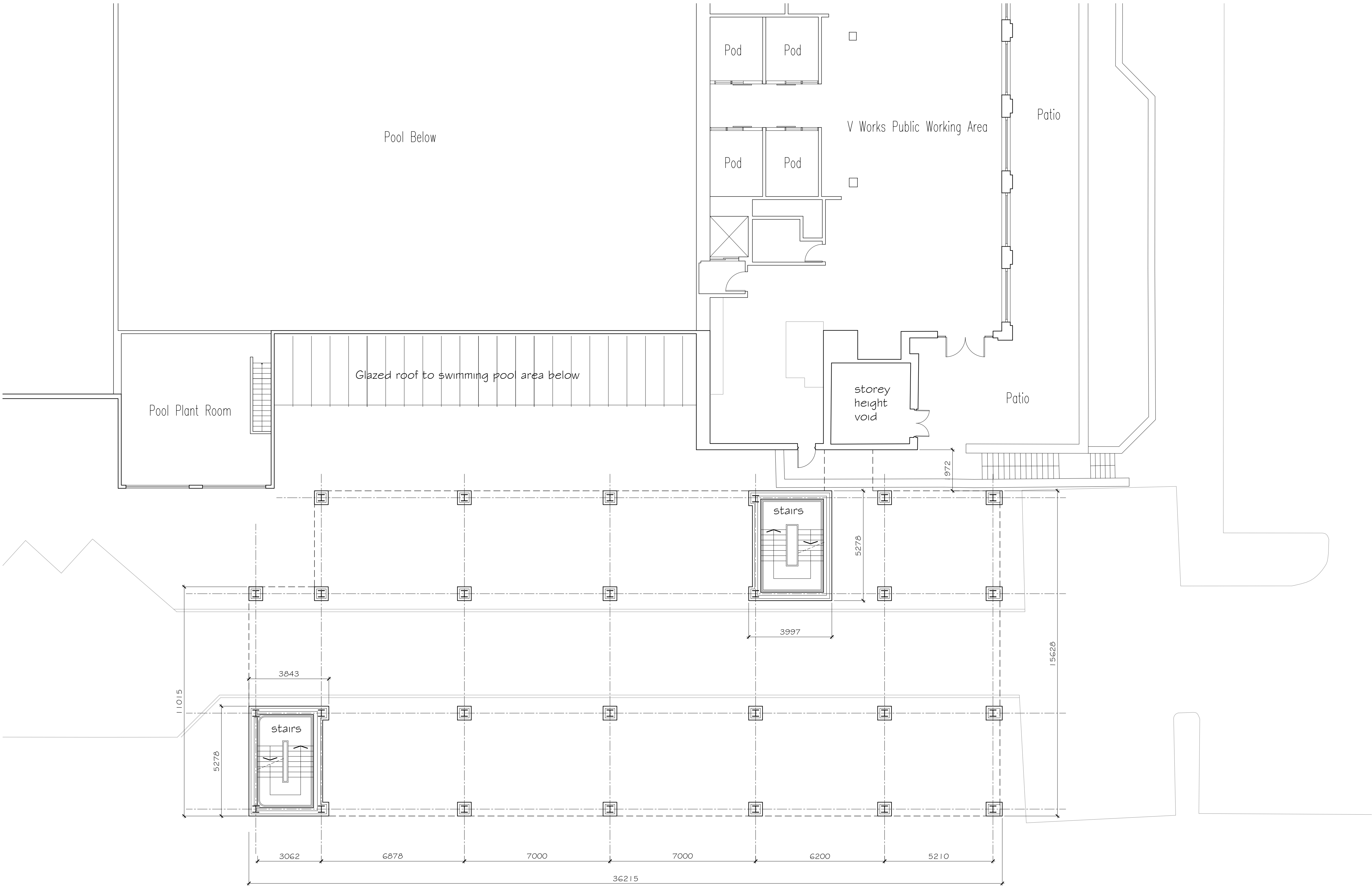
Status:
Planning

Client:
Village Hotel Club

Contract:
Proposed Extension
Village Hotel, Waterford Business Park
Bury, BL9 7BQ

Drawing:
Lower Ground Floor Plan
As Proposed

Drawing No: AS863 08	Revision: P1	Scales: 1:100 @ A1
Drawn: rnc	Checked:	Date: August '24



All dimensions and levels are to be checked on site.

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P1	Drawing progressed for planning	16.10.24	rnc
Rev	Description	Date	By

Status:
Planning

Client:
Village Hotel Club

Contract:
Proposed Extension
Village Hotel, Waterford Business Park
Bury, BL9 7BQ

Drawing:
Ground Floor Plan
As Proposed

Drawing No: AS863 09	Revision: P1	Scales: 1:100 @ A1
Drawn: rnc	Checked:	Date: August '24

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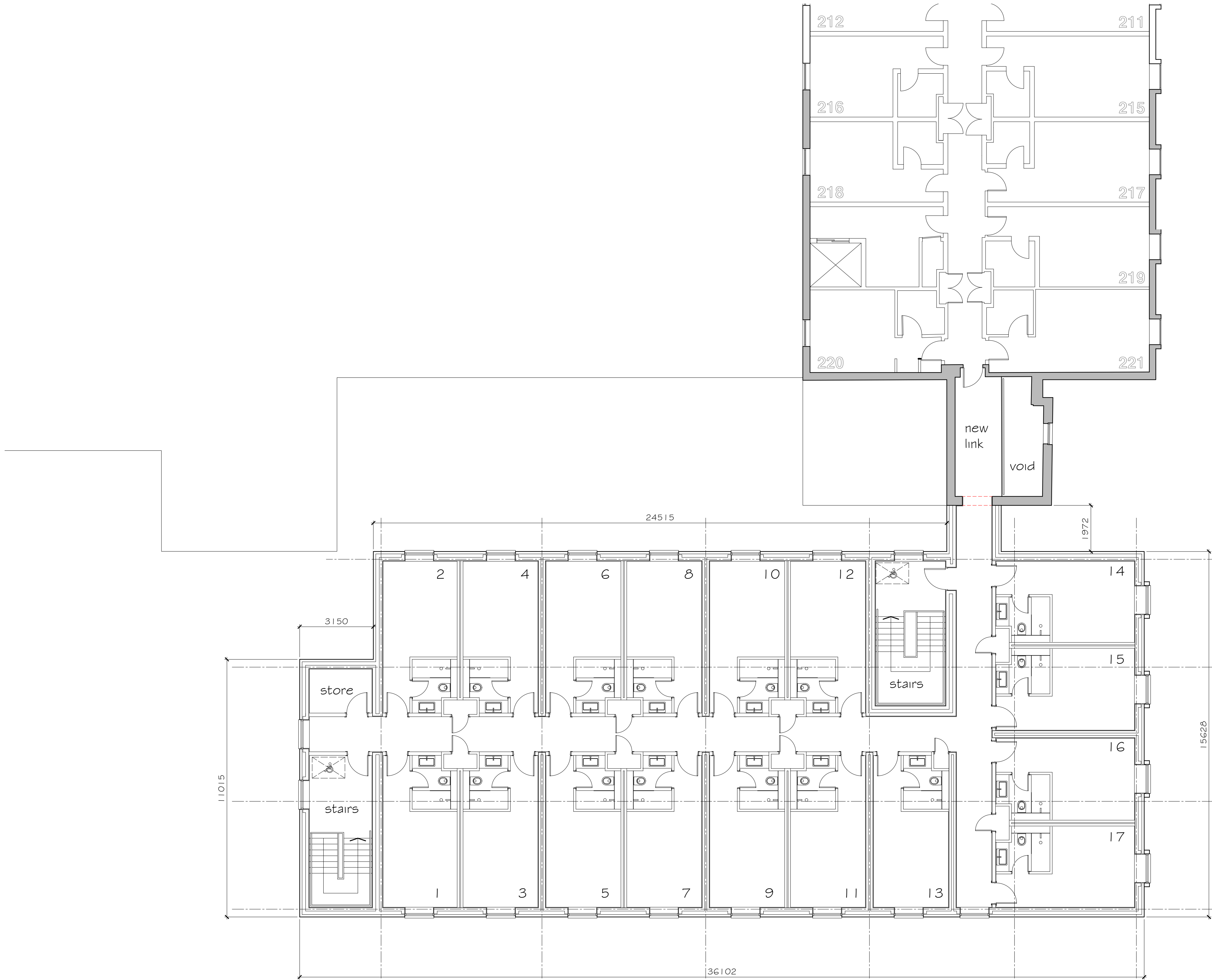
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Status:
Planning

Contract:
Proposed Extension
Village Hotel, Waterford Buisness Park
Bury, BL9 7BQ

Drawing No: AS863 10	Revision: P1	Scales: 1:100 @ A1
Drawn: rmc	Checked:	Date: August '24



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P1	Drawing progressed for planning	16.10.24	rnc
Rev	Description	Date	By

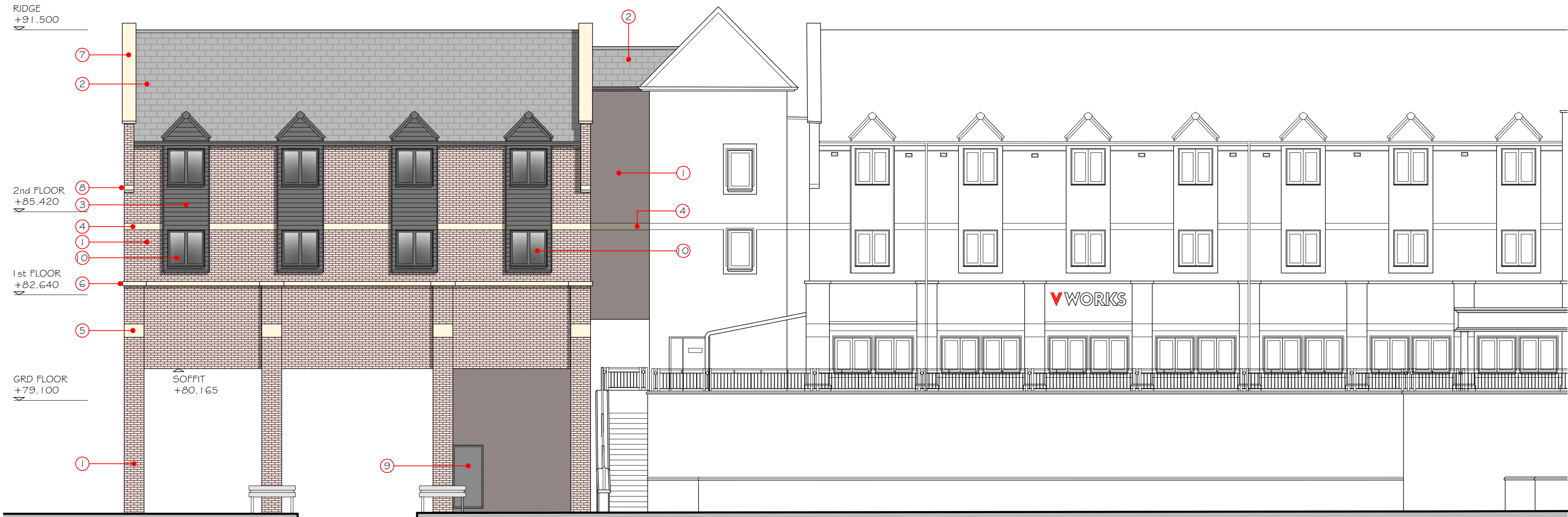
Status:
Planning

Client:
Village Hotel Club

Contract:
Proposed Extension
Village Hotel, Waterford Business Park
Bury, BL9 7BQ

Drawing:
Second Floor Plan
As Proposed

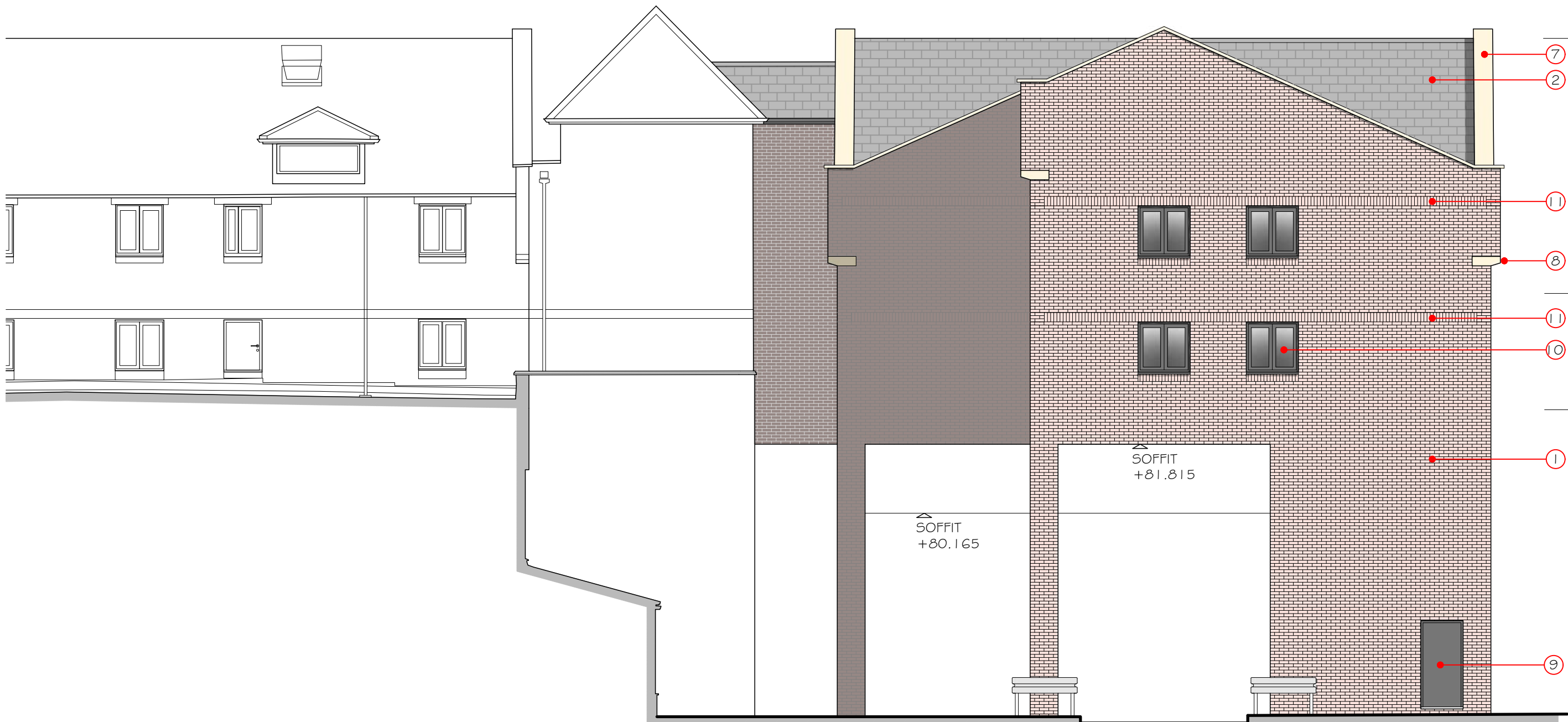
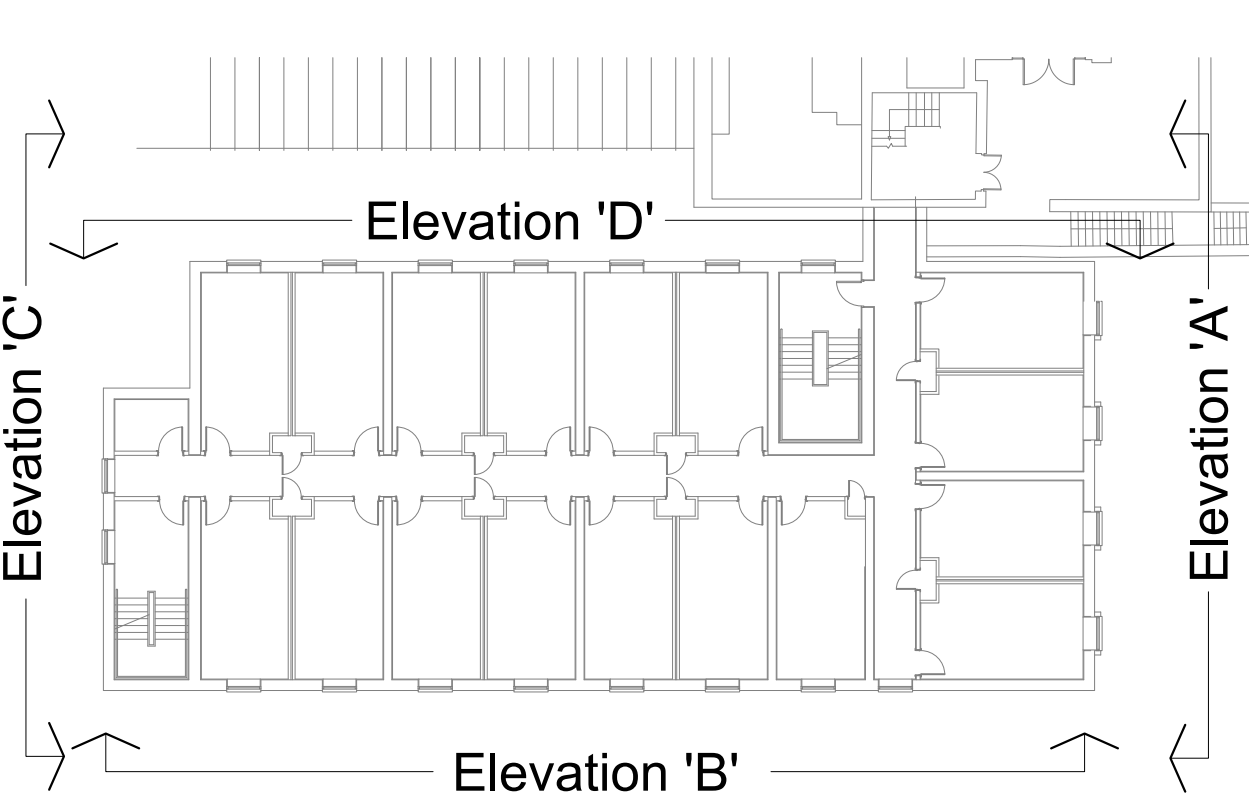
Drawing No: AS863 11	Revision: P1	Scales: 1:100 @ A1
Drawn: rnc	Checked:	Date: August '24



Elevation 'A'



Elevation 'B'



Elevation 'C'

All dimensions and levels are to be checked on site.

Any discrepancies are to be reported to Cube Architecture and Design before any work commences.

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Title overlay drawings and ownership boundaries are produced using all reasonable endeavours.

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EXTERNAL FINISHES SPECIFICATION

- 1 External masonry to main elevations laid in traditional stretcher bond. Bricks to match existing
- 2 Fibre cement roofing slates finished in natural slate colour to match existing main roof
- 3 Horizontally laid composite cladding boards made from recycled plastics, finish/colour to match existing
- 4 215mm dry-cast stone string course with a fine surface finish: natural stone colour
- 5 2 x 215mm dry-cast stone string course with a fine surface finish: natural stone colour
- 6 140mm dry-cast stone projecting string course with a fine surface finish: natural stone colour
- 7 450 x 75mm dry-cast coping stone with a fine surface finish mechanically fixed to parapet wall: natural stone colour
- 8 665 x 140mm dry-cast corbel stone with a fine surface finish mechanically fixed back to wall: natural stone colour
- 9 External flush faced steel security escape door system with insulated core & frames. Door and frame finish colour to be grey or similar approved.
- 10 Aluminum framed thermally broken casement window system. All glass to be double glazed toughened glass panels. Frame finish colour to be dark grey to match existing windows.
- 11 Brickwork soldier course



Elevation 'D'

P1	Drawing progressed for planning	16.10.24	rmc
Rev	Description	Date	By

Client:
Village Hotel Club

Contract:
Proposed Extension
Village Hotel, Waterford Business Park
Bury, BL9 7BQ

Drawing:
Elevations
As Proposed

Status:

Drawing No:
AS863 12
Drawn:
rmc

Revision:
P1
Checked:

Scales:
1:100 @ A1
Date:
August '24

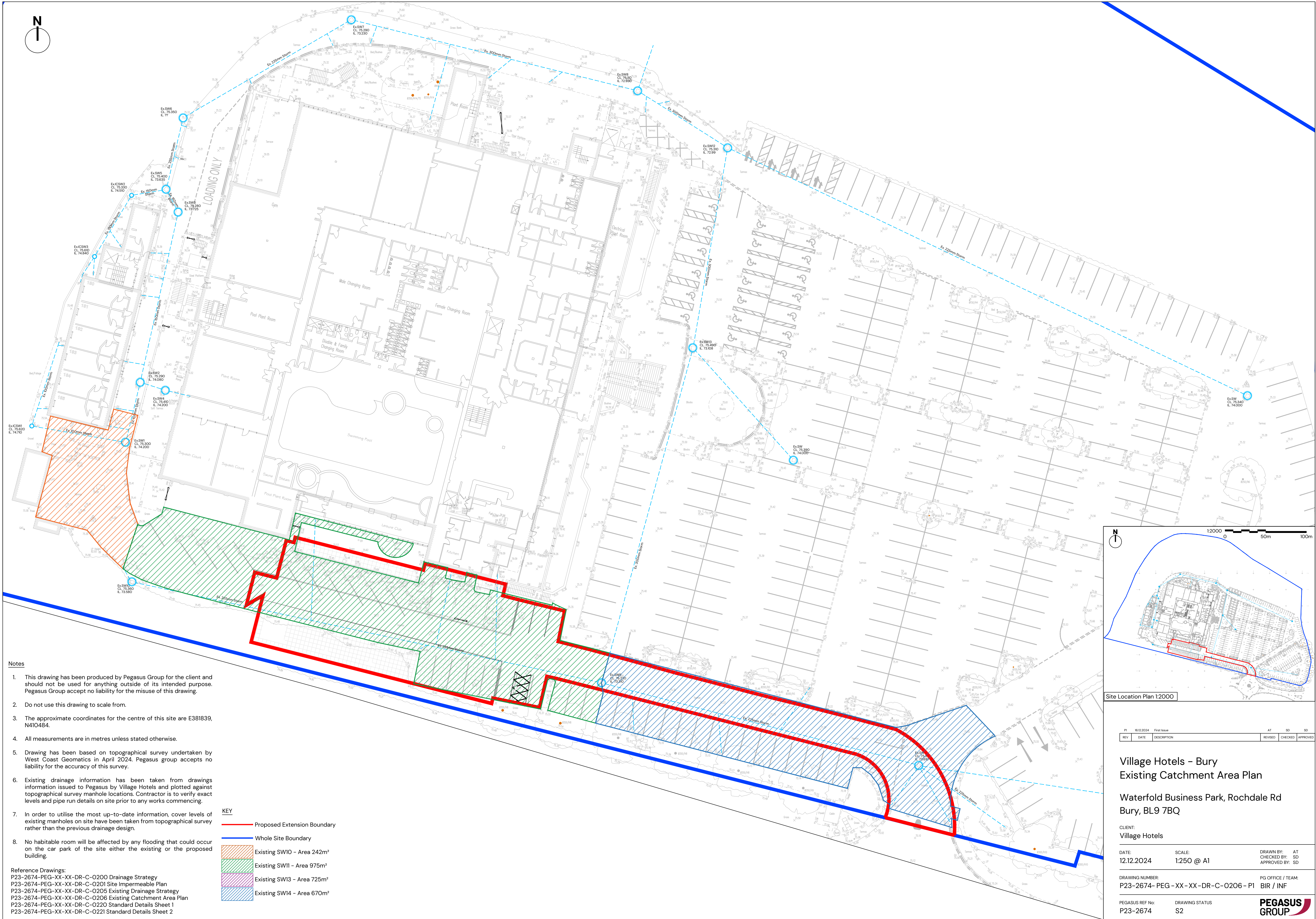
CUBE
architecture and design
www.cubearchitecture.net
DO NOT scale from this drawing.

commercial house
clarenda avenue
trafford park
m17 1qs
tel: 0161 848 5883



Appendix C – Existing Drainage Strategy





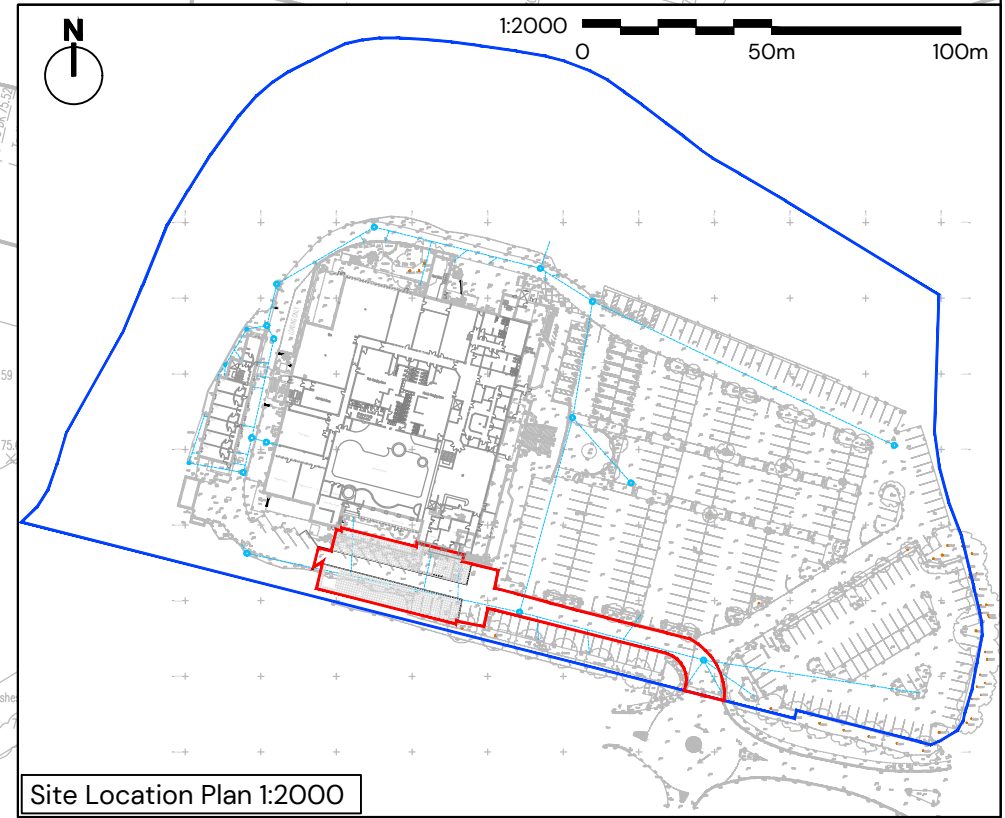
Notes

1. This drawing has been produced by Pegasus Group for the client and should not be used for anything outside of its intended purpose. Pegasus Group accept no liability for the misuse of this drawing.
2. Do not use this drawing to scale from.
3. The approximate coordinates for the centre of this site are E381839, N410484.
4. All measurements are in metres unless stated otherwise.
5. Drawing has been based on topographical survey undertaken by West Coast Geomatics in April 2024. Pegasus group accepts no liability for the accuracy of this survey.
6. Existing drainage information has been taken from drawings information issued to Pegasus by Village Hotels and plotted against topographical survey manhole locations. Contractor is to verify exact levels and pipe run details on site prior to any works commencing.
7. In order to utilise the most up-to-date information, cover levels of existing manholes on site have been taken from topographical survey rather than the previous drainage design.
8. No habitable room will be affected by any flooding that could occur on the car park of the site either the existing or the proposed building.

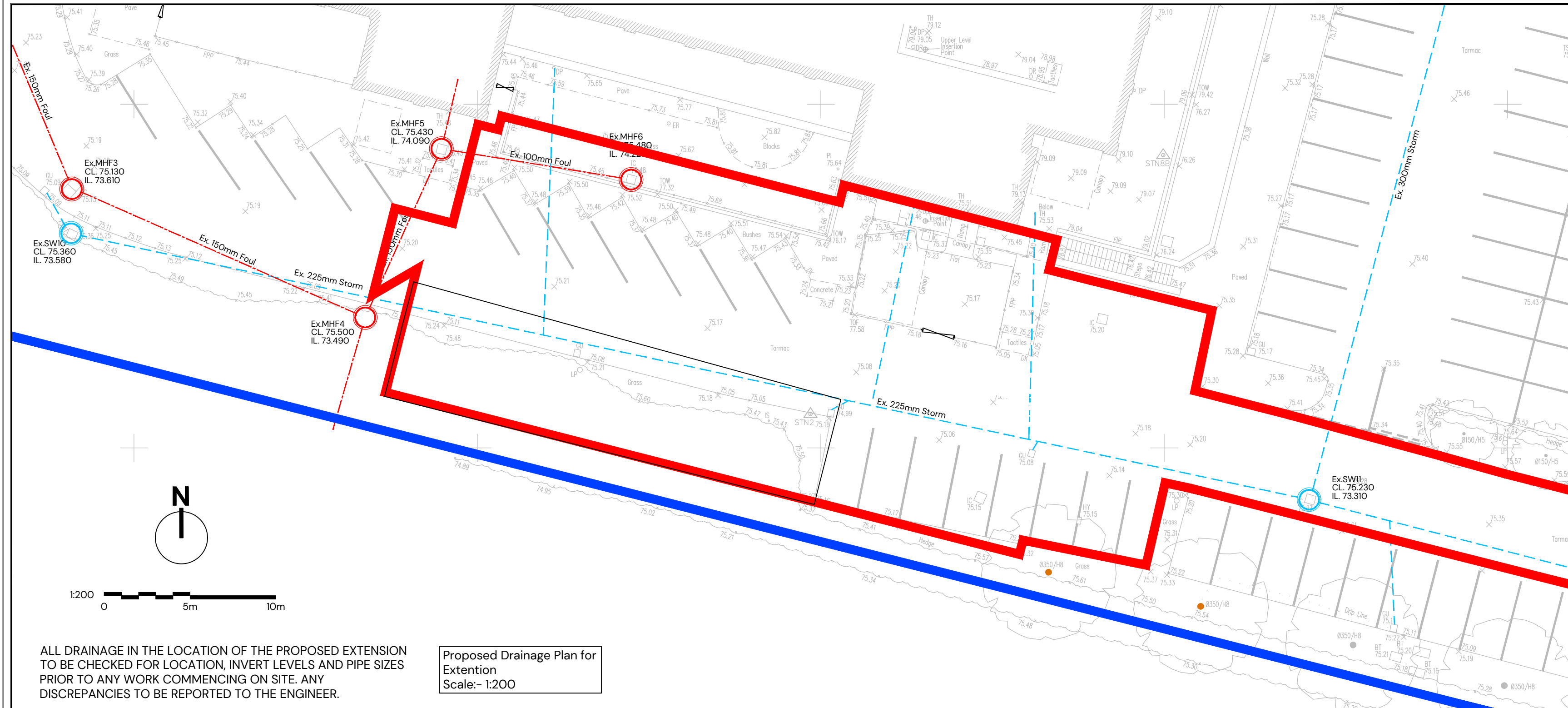
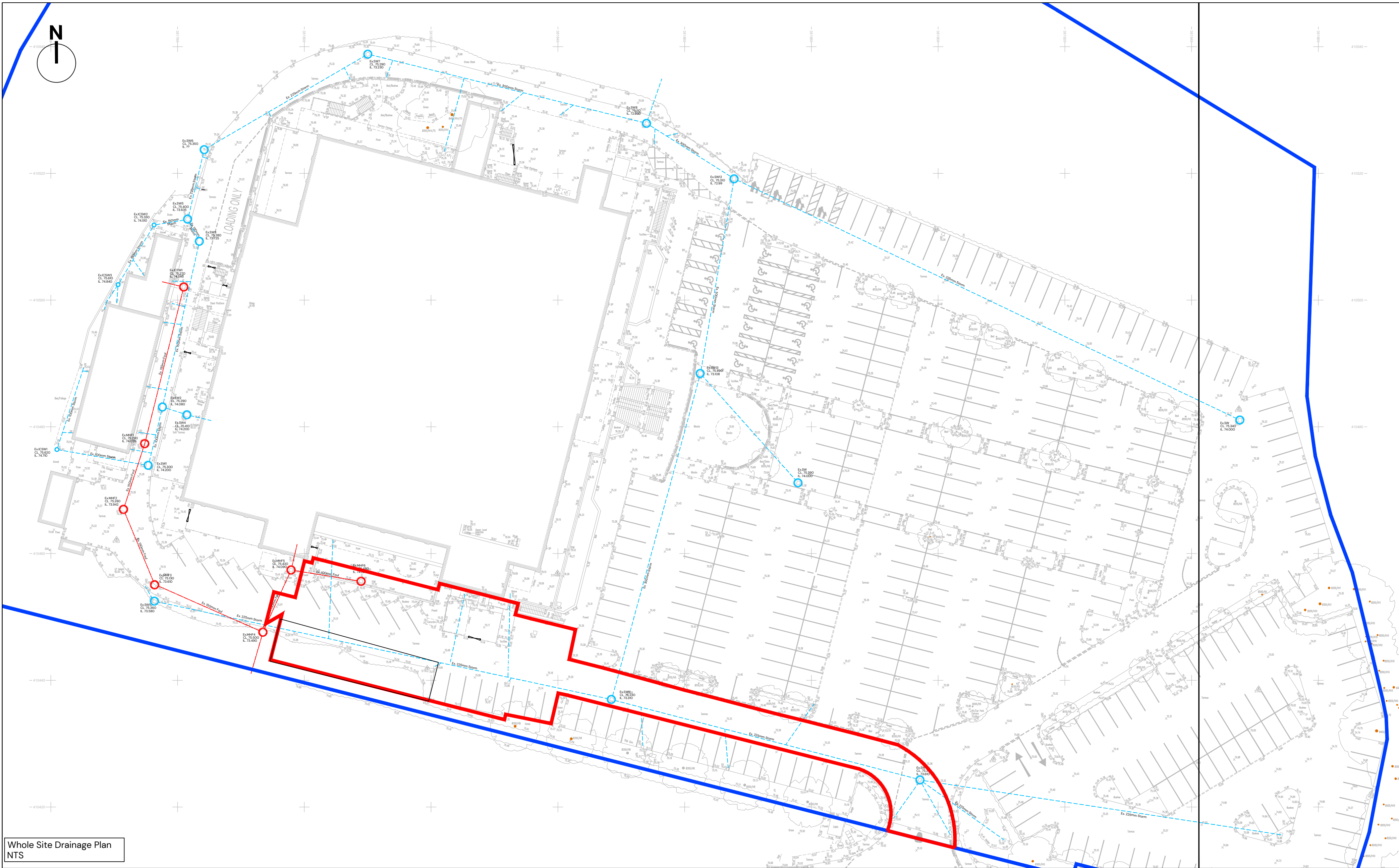
KEY

- Proposed Extension Boundary
- Whole Site Boundary
- Existing SW10 - Area 242m²
- Existing SW11 - Area 975m²
- Existing SW13 - Area 725m²
- Existing SW14 - Area 670m²

Reference Drawings:
P23-2674-PEG-XX-XX-DR-C-0200 Drainage Strategy
P23-2674-PEG-XX-XX-DR-C-0201 Site Impermeable Plan
P23-2674-PEG-XX-XX-DR-C-0205 Existing Drainage Strategy
P23-2674-PEG-XX-XX-DR-C-0206 Existing Catchment Area Plan
P23-2674-PEG-XX-XX-DR-C-0220 Standard Details Sheet 1
P23-2674-PEG-XX-XX-DR-C-0221 Standard Details Sheet 2

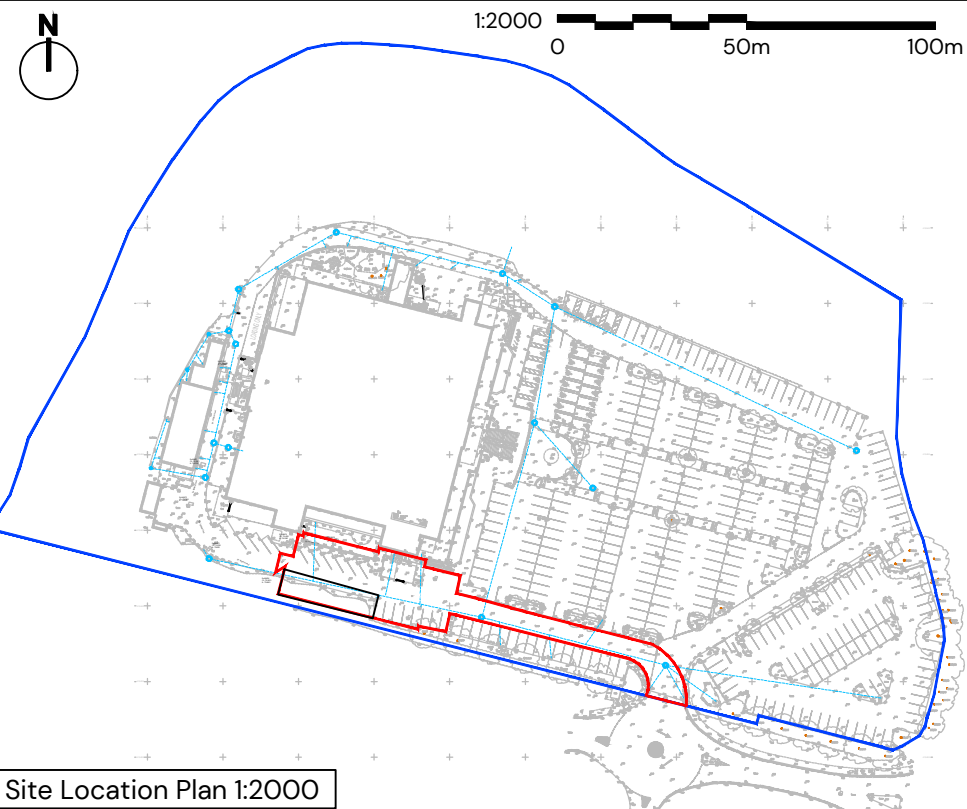


P1 16.12.2024 First Issue			AT	SD	SD
REV	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED
Village Hotels - Bury Existing Catchment Area Plan					
Waterfold Business Park, Rochdale Rd Bury, BL9 7BQ					
CLIENT: Village Hotels					
DATE: 12.12.2024	SCALE: 1:250 @ A1	DRAWN BY: AT CHECKED BY: SD APPROVED BY: SD			
DRAWING NUMBER: P23-2674-PEG-XX-XX-DR-C-0206-P1			PG OFFICE / TEAM: BIR / INF		
PEGASUS REF No: P23-2674		DRAWING STATUS S2		PEGASUS GROUP	



- Key
- Proposed Extension Boundary
 - Whole Site Boundary
 - Existing - Foul Network
 - Existing - Foul Water Chamber
 - Existing - Surface Water Network
 - Existing - Surface Water Chamber

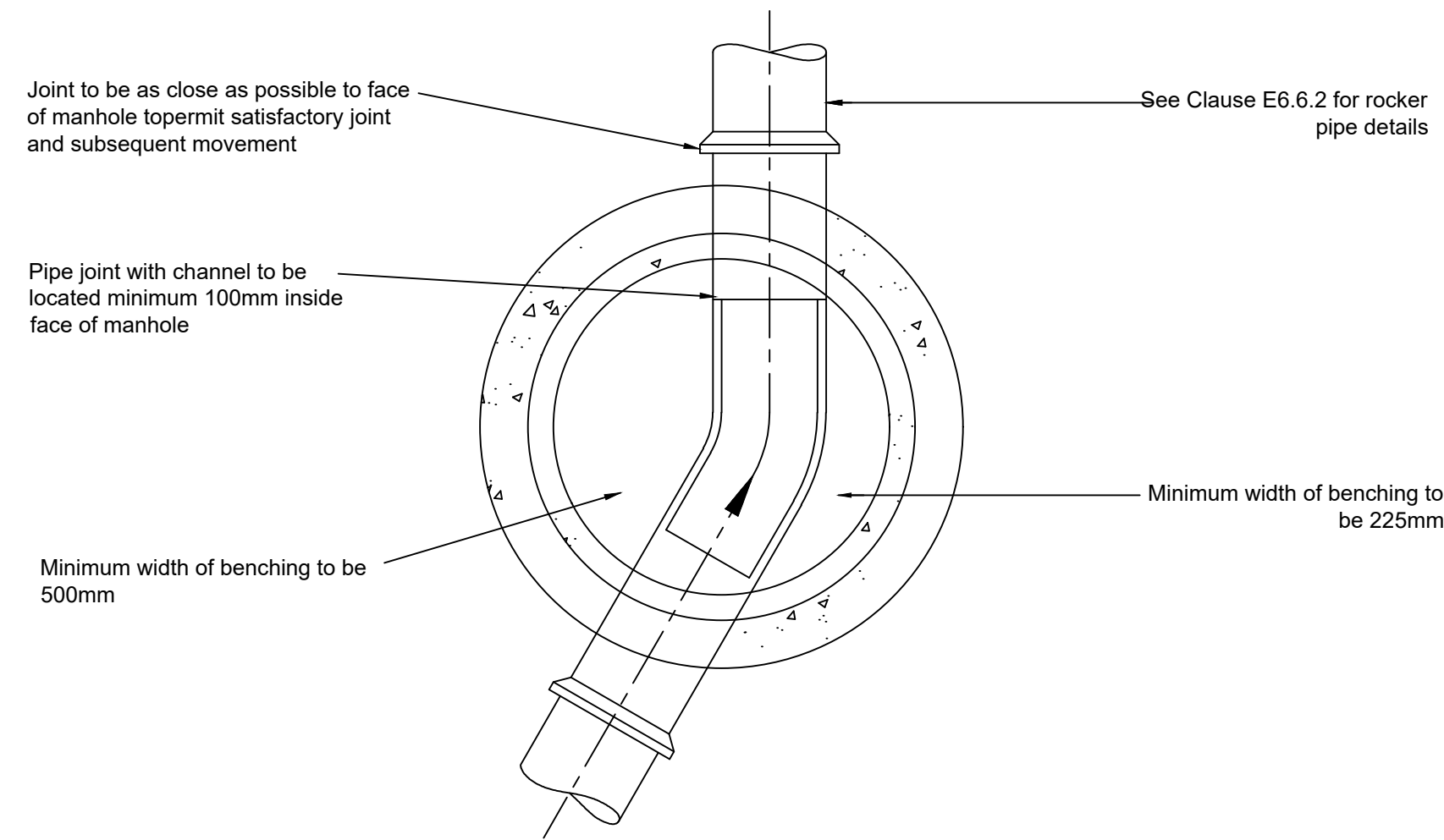
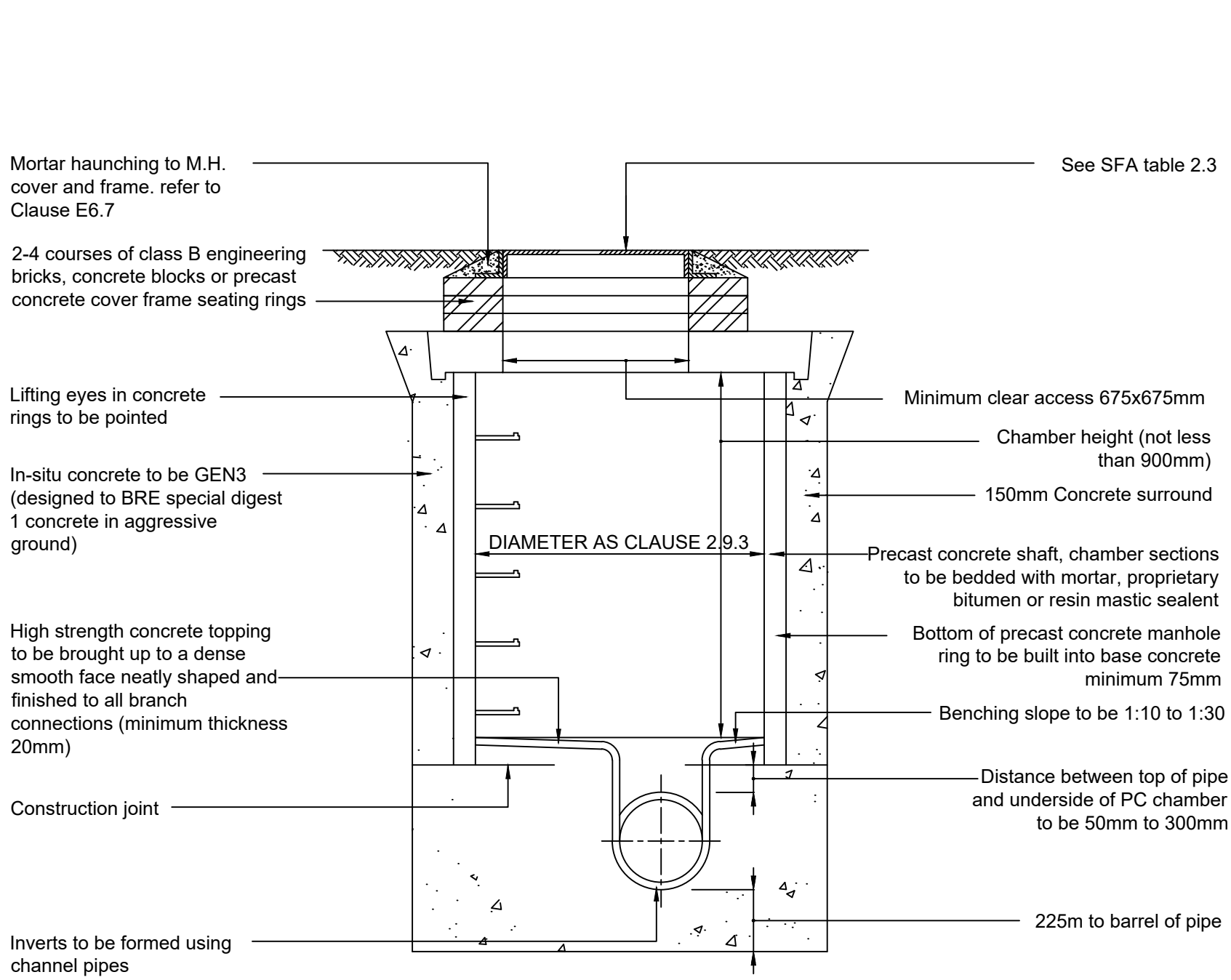
- Notes
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 - All measurements are in metres unless stated otherwise.
 - Drawing has been based on topographical survey undertaken by West Coast Geomatics in April 2024. Pegasus group accepts no liability for the accuracy of this survey.
 - Existing drainage information has been taken from drawings information issued to Pegasus by Village Hotels and plotted against topographical survey manhole locations. Contractor is to verify exact levels and pipe run details on site prior to any works commencing.
 - Design intended to avoid the footprint of the lower ground construction, or an assumed 600mm easement around the ground floor structural features to account for foundations, whichever is larger. Contractor to verify this prior to commencing works.
 - In order to utilise the most up-to-date information, cover levels of existing manholes on site have been taken from topographical survey rather than the previous drainage design.
 - Some existing drainage has been shown for context. For full existing drainage layout, including abandoned network, see drawings mentioned in Note 6.
- Reference Drawings:
- P23-2674-PEG-XX-XX-DR-C-0200 Drainage Strategy
 - P23-2674-PEG-XX-XX-DR-C-0201 Site Impermeable Plan
 - P23-2674-PEG-XX-XX-DR-C-0205 Existing Drainage Strategy
 - P23-2674-PEG-XX-XX-DR-C-0206 Existing Catchment Plan
 - P23-2674-PEG-XX-XX-DR-C-0220 Standard Details Sheet 1
 - P23-2674-PEG-XX-XX-DR-C-0221 Standard Details Sheet 2



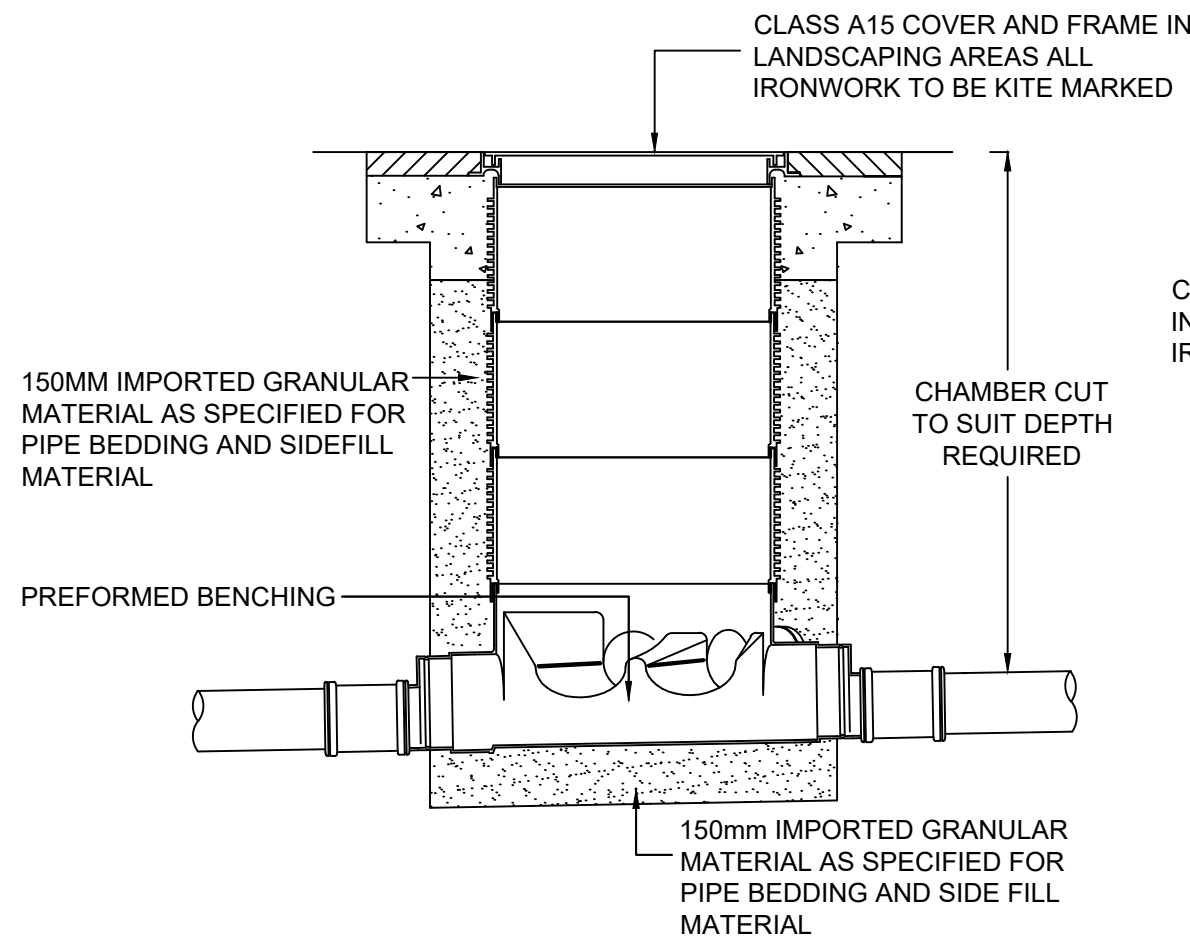
Discharge Table & Notes added and viewpoints amended to show all existing drainage.					
P1	26.07.2024	First Issue	SD	SD	SAJ
REV	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED
Village Hotels – Bury					
Existing Drainage Strategy					
Waterfold Business Park, Rochdale Rd					
Bury, BL9 7BQ					
CLIENT: Village Hotels					
DATE: 12.12.2024	SCALE: As Shown @ A1	DRAWN BY: AT CHECKED BY: SD APPROVED BY: SD			
DRAWING NUMBER: P23-2674-PEG-XX-XX-DR-C-0205-P1		PG OFFICE / TEAM: BIR / INF			
PEGASUS REF No: P23-2674	DRAWING STATUS S2	PEGASUS GROUP			



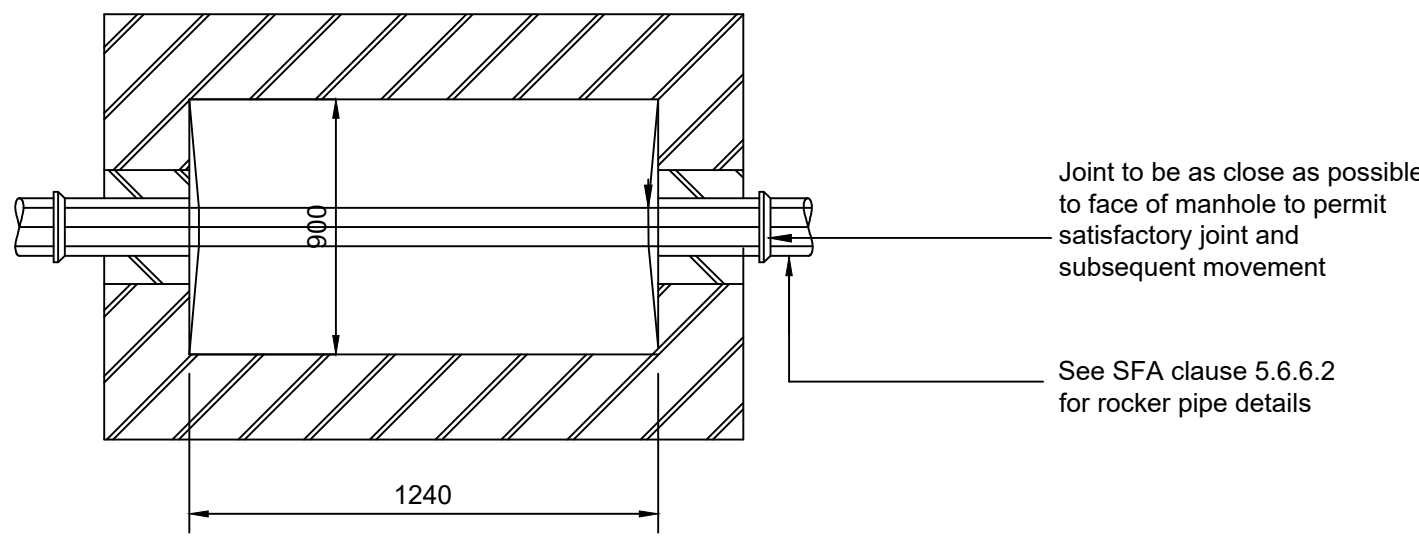
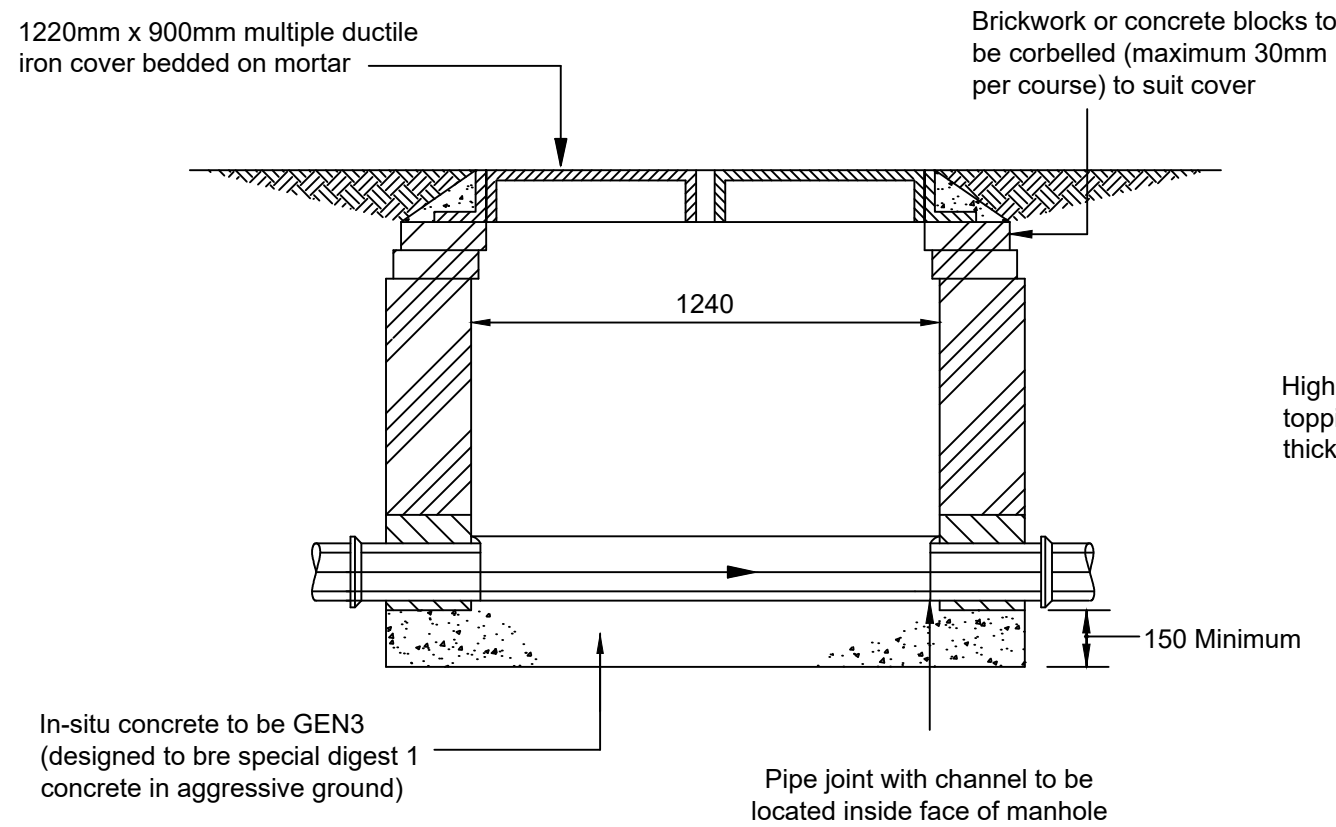
Appendix D – Proposed Drainage Strategy



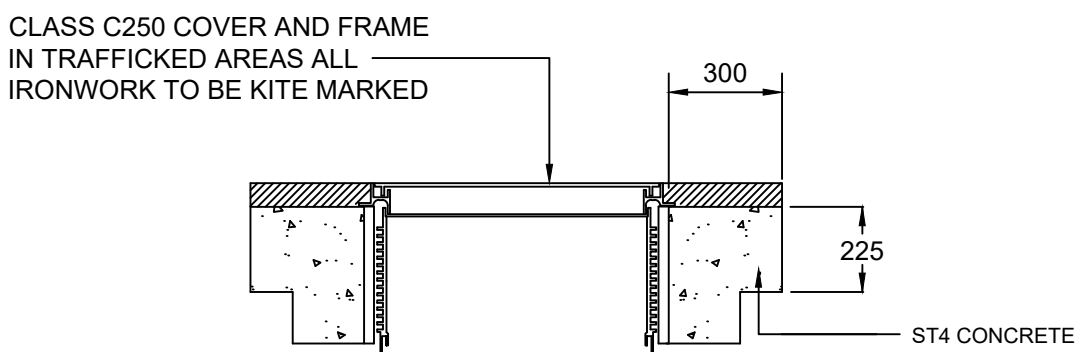
TYPICAL MANHOLE DETAIL - TYPE 'B'
DEPTH TO SOFFIT 1.5m TO 3.0m
FOR STEPS AND ACCESS ARRANGEMENTS SEE DESIGN CONSTRUCTION STANDARDS
SCALE 1:20



TYPICAL INSPECTION CHAMBER DETAIL
MAX. DEPTH 1.2m
SCALE 1:20
SEE RIGHT FOR DETAIL OF COVER IN TRAFFICKED AREAS



TYPICAL MANHOLE DETAIL - TYPE 'C'
DEPTH FROM COVER LEVEL TO SOFFIT OF PIPE 1.0m TO 1.5m
SCALE 1:20



DETAIL OF COVER WHERE INSPECTION CHAMBER IN TRAFFICKED AREA
SCALE 1:20

1:10
0 250mm 500mm

Notes

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3. The approximate coordinates for the centre of this site are E381839, N410484.
4. All measurements are in millimetres unless stated otherwise.
5. Oil interceptor details can be obtained directly from chosen manufacturer.

Reference Drawings:

P23-2674-PEG-XX-XX-DR-C-0200 Drainage Strategy
P23-2674-PEG-XX-XX-DR-C-0201 Impermeable Area Plan
P23-2674-PEG-XX-XX-DR-C-0205 Existing Drainage Strategy
P23-2674-PEG-XX-XX-DR-C-0206 Existing Catchment Plan
P23-2674-PEG-XX-XX-DR-C-0220 Standard Details Sheet 1
P23-2674-PEG-XX-XX-DR-C-0221 Standard Details Sheet 2

REV	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED
SD	SD	SAJ			

Village Hotels – Bury Standard Details – Sheet 2

Waterfold Business Park, Rochdale Rd
Bury, BL9 7BQ

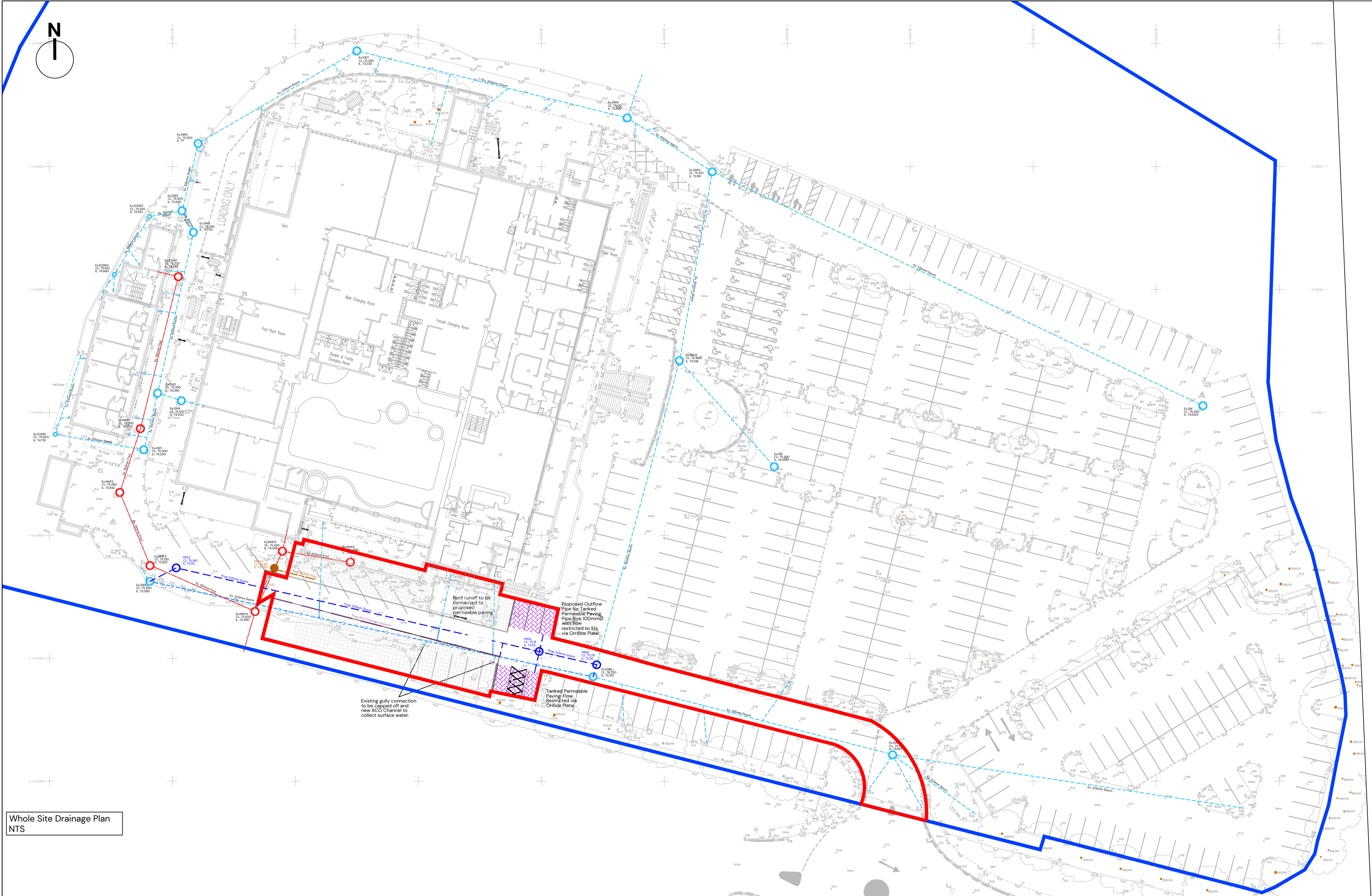
CLIENT:
Village Hotels

DATE: 16.12.2024 SCALE: AS SHOWN @ A1 DRAWN BY: AT
CHECKED BY: SD
APPROVED BY: SD

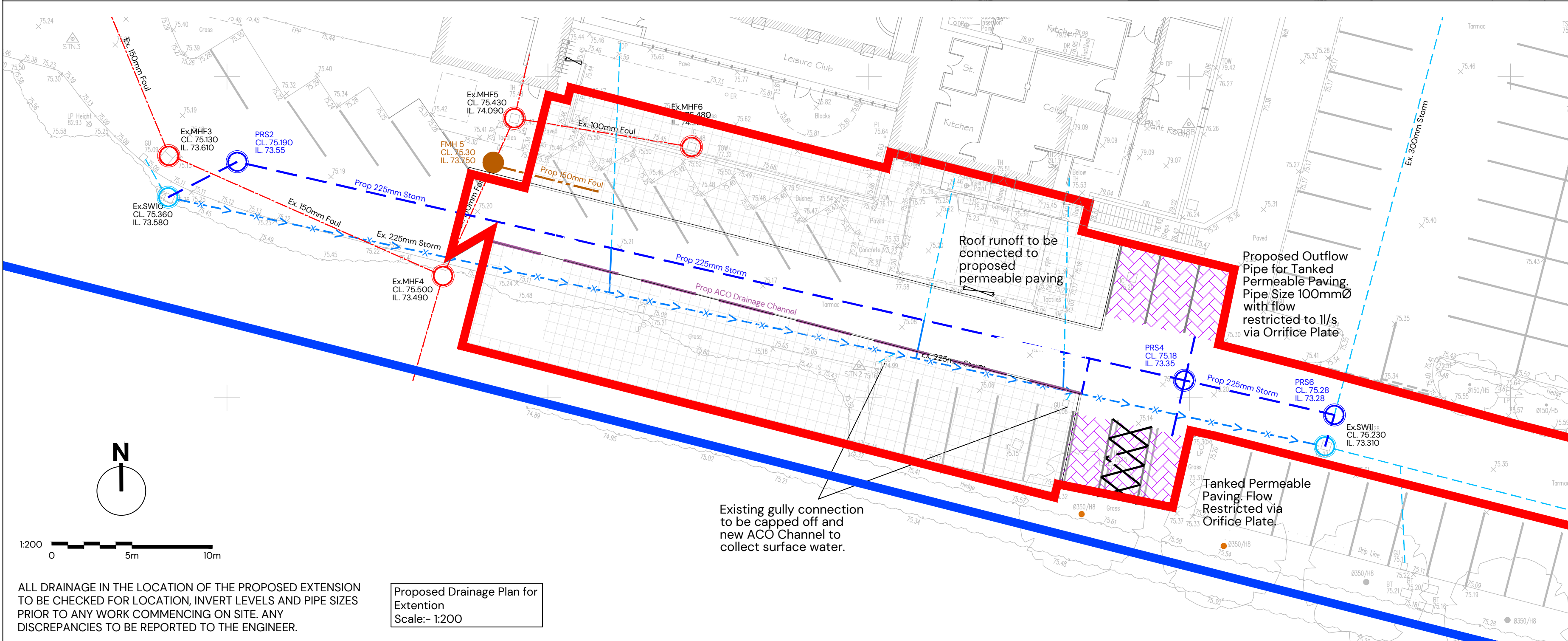
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BIR / INF

PEGASUS REF No: P23-2674 DRAWING STATUS: S2

PEGASUS GROUP



Whole Site Drainage Plan
NTS



Proposed Drainage Plan for
Extension
Scale:- 1:200

Existing & Proposed Site Discharge Rates from MH ExSW13		
Storm Duration (Critical)	Existing Total Discharge Rate from Site (l/s)	Proposed Total Discharge Rate from Site (l/s)
2 Year	29.2	23
30 Year	57	42.7
100 Year	73.7	54.8
100 Year + 40% CC	93.5	73.6

Note:-

Has can be seen from the table above the Total Proposed Discharge Rate from the site with the Proposed Extension and introduction of Permeable Paving the discharge rate is reduced on all storm durations upto 100Yr + CC event.

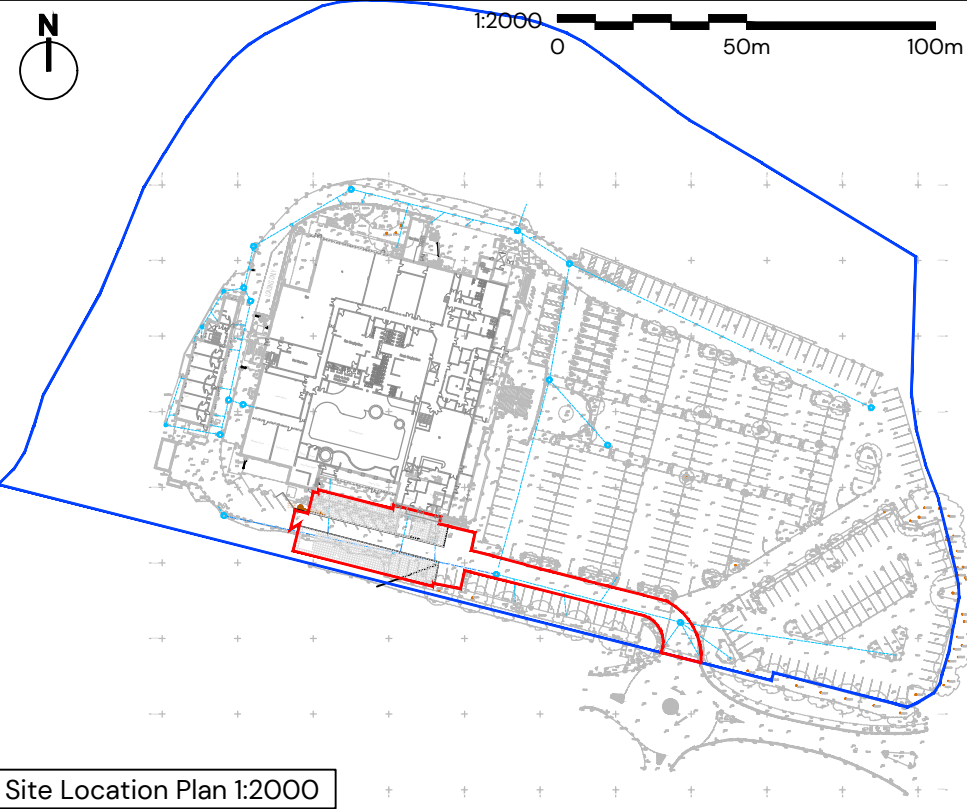
With this it can be seen that the proposed extension will have no effect on the storm drainage for the site or the downstream drainage. See Drainage Calculations for all storm durations.

The proposed Extension Roof is discharged to the base of the Permeable Paving along with the area of Car Park. The total area of this equates to the area of the proposed extension with the flow limited to 0.9l/s on a 100Yr + CC event and 0.4l/s on a 2Yr event.

- Notes
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 - The approximate coordinates for the centre of this site are E381839, N410484.
 - All measurements are in metres unless stated otherwise.
 - Drawing has been based on topographical survey undertaken by West Coast Geomatics in April 2024. Pegasus group accepts no liability for the accuracy of this survey.
 - Existing drainage information has been taken from drawings information issued to Pegasus by Village Hotels and plotted against topographical survey manhole locations. Contractor is to verify exact levels and pipe run details on site prior to any works commencing.
 - Drainage strategy redesign has been based proposed layout drawing AS863 07 P2 Proposed Site Plan provided by Village Hotels. Pegasus Group accepts no liability for the accuracy of these drawings.
 - Design intended to avoid the footprint of the lower ground construction, or an assumed 600mm easement around the ground floor structural features to account for foundations, whichever is larger. Contractor to verify this prior to commencing works.
 - In order to utilise the most up-to-date information, cover levels of existing manholes on site have been taken from topographical survey rather than the previous drainage design.
 - Some existing drainage has been shown for context. For full existing drainage layout, including abandoned network, see drawings mentioned in Note 6.
 - Proposed drainage intended to be a like-for-like replacement of existing network on site. Storm network assumed to function as per existing with no alteration to the outgoing discharge.
 - The Introduction of Permeable Paving will reduce the area drained to it by less than 1.0l/s
 - No habitable room will be affected by any flooding that could occur on the car park of the site either the existing or the proposed building.

Reference Drawings:

P23-2674-PEG-XX-XX-DR-C-0200 Drainage Strategy
P23-2674-PEG-XX-XX-DR-C-0201 Site Impermeable Plan
P23-2674-PEG-XX-XX-DR-C-0205 Existing Drainage Strategy
P23-2674-PEG-XX-XX-DR-C-0206 Existing Catchment Plan
P23-2674-PEG-XX-XX-DR-C-0220 Standard Details Sheet 1
P23-2674-PEG-XX-XX-DR-C-0221 Standard Details Sheet 2



Site Location Plan 1:2000

REV	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED
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Village Hotels – Bury Drainage Strategy

Waterfold Business Park, Rochdale Rd
Bury, BL9 7BQ

CLIENT:
Village Hotels

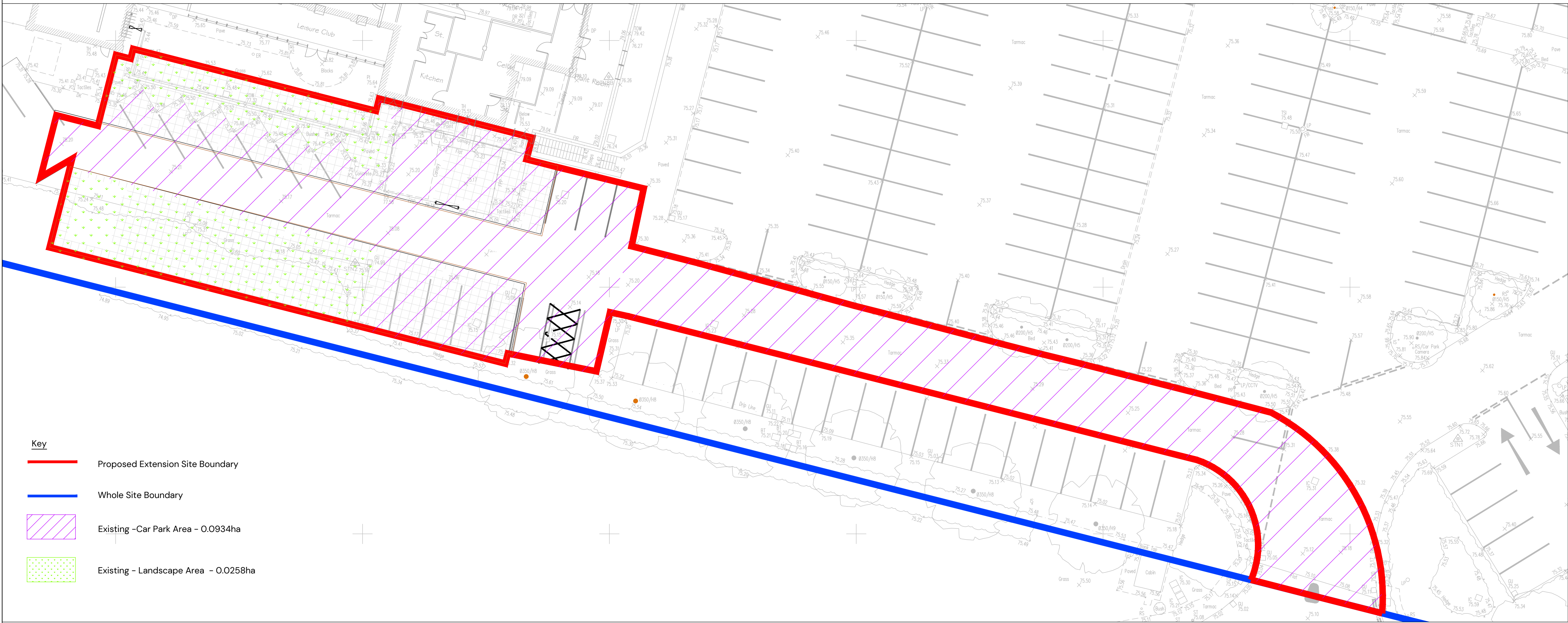
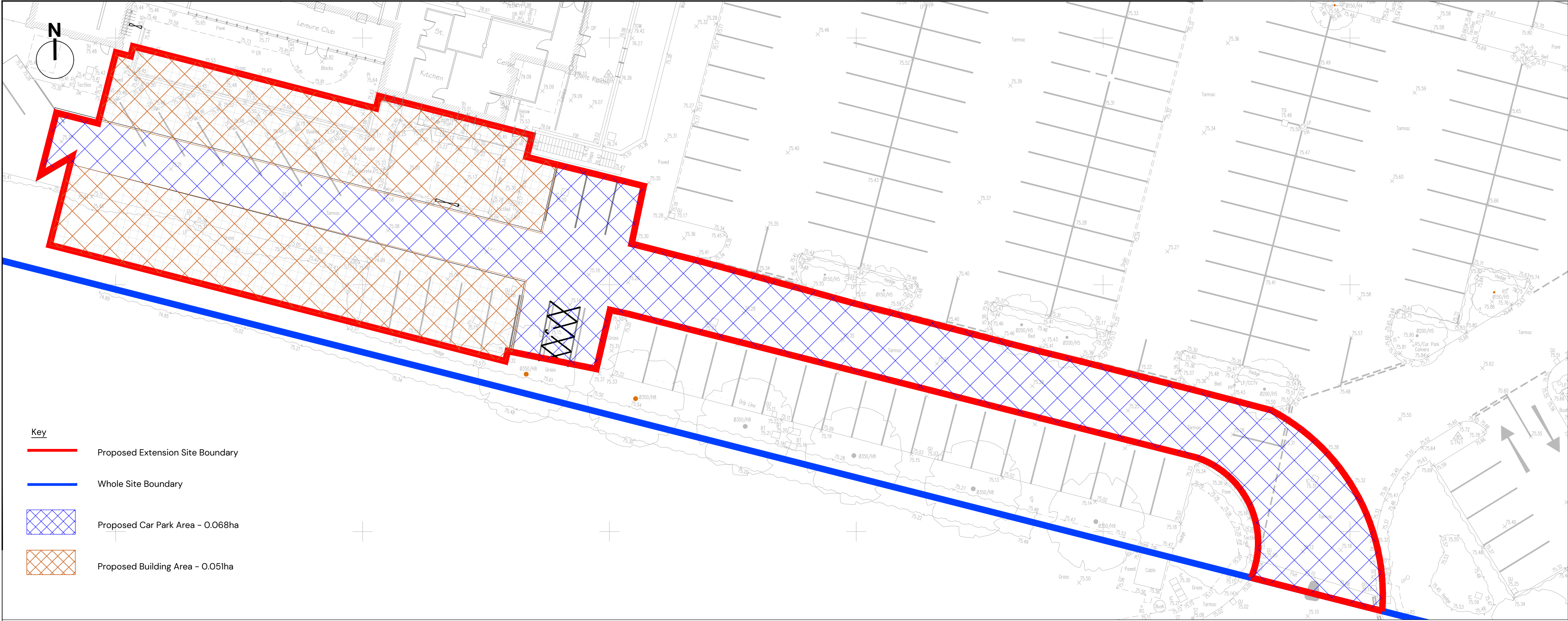
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SCALE: As Shown @ A1

DRAWN BY: AT
CHECKED BY: SD
APPROVED BY: SD

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PG OFFICE / TEAM: BIR / INF

PEGASUS REF No: P23-2674
DRAWING STATUS: S2

PEGASUS
GROUP

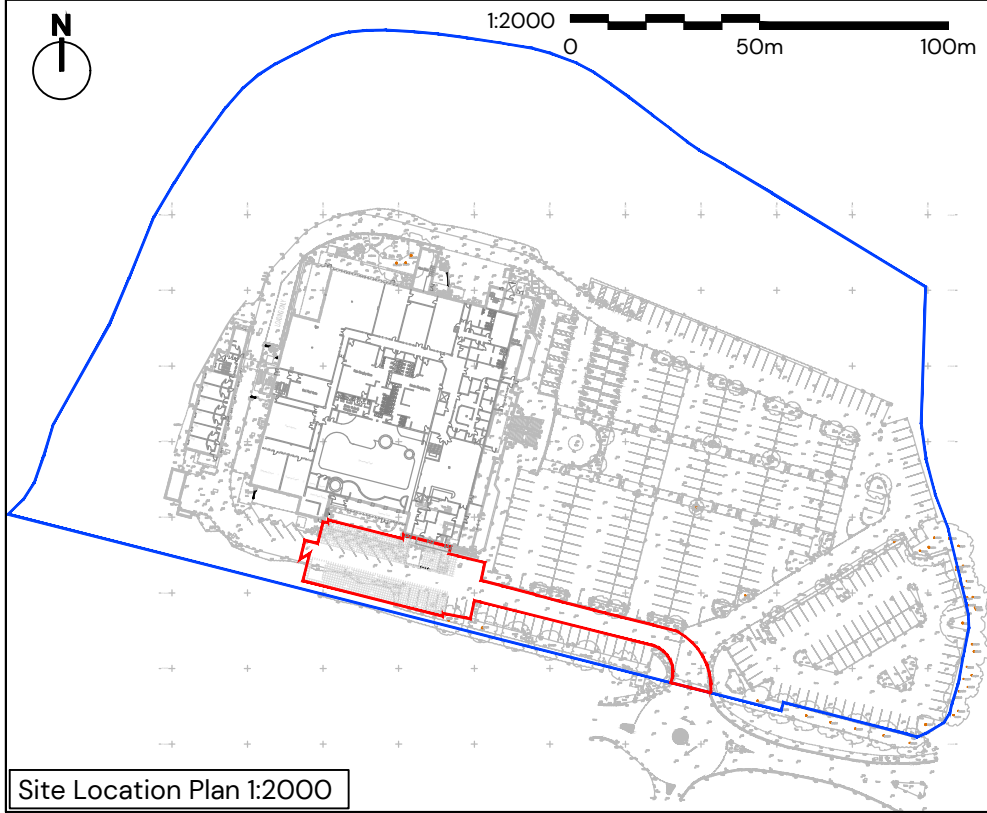


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- Do not use this drawing to scale from.
- The approximate coordinates for the centre of this site are E381839, N410484.
- All measurements are in metres unless stated otherwise.
- The total area of the red line boundary is 0.1185ha.

Reference Drawings:

P23-2674-PEG-XX-XX-DR-C-0200 Drainage Strategy
P23-2674-PEG-XX-XX-DR-C-0201 Site Impermeable Plan
P23-2674-PEG-XX-XX-DR-C-0205 Existing Drainage Strategy
P23-2674-PEG-XX-XX-DR-C-0206 Existing Catchment Plan
P23-2674-PEG-XX-XX-DR-C-0220 Standard Details Sheet 1
P23-2674-PEG-XX-XX-DR-C-0221 Standard Details Sheet 2



Discharge Table & Notes added and viewpoints amended to show all existing drainage first issue					SD	SD	SAJ
REV	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED		

Village Hotels - Bury Impermeable Area Plan

Waterfold Business Park, Rochdale Rd
Bury, BL9 7BQ

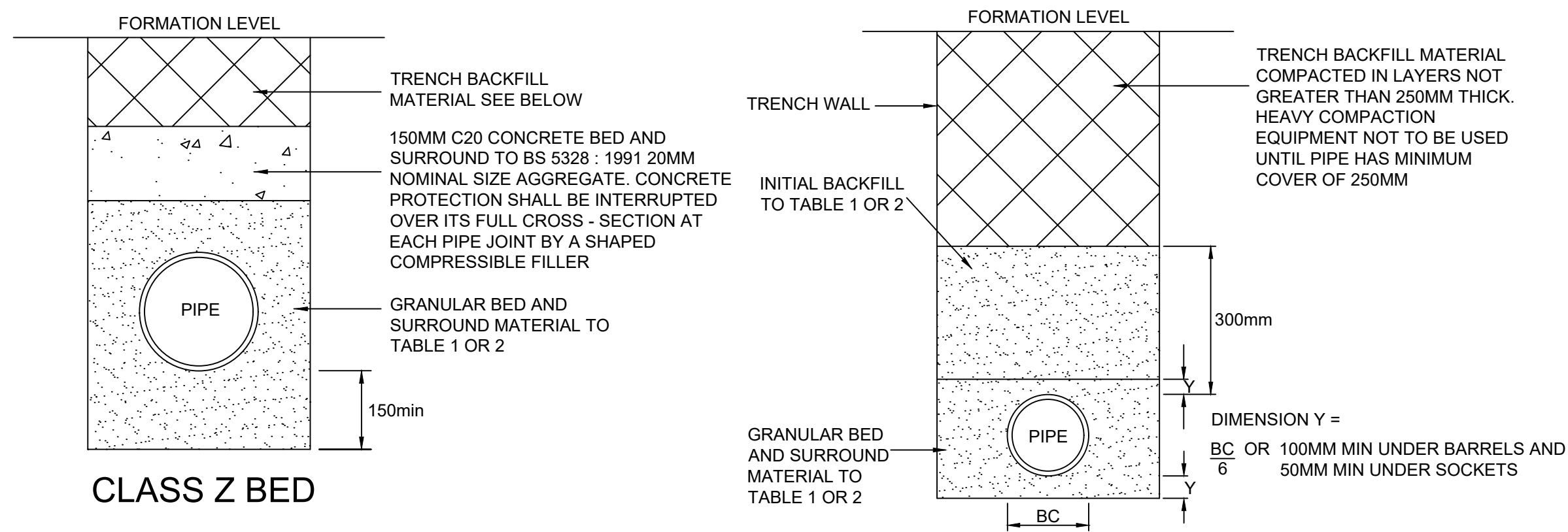
CLIENT:
Village Hotels

DATE: 12.12.2024 SCALE: 1:200 @ A1
DRAWN BY: AT
CHECKED BY: SD
APPROVED BY: SD

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PEGASUS REF No: P23-2674 DRAWING STATUS: S2

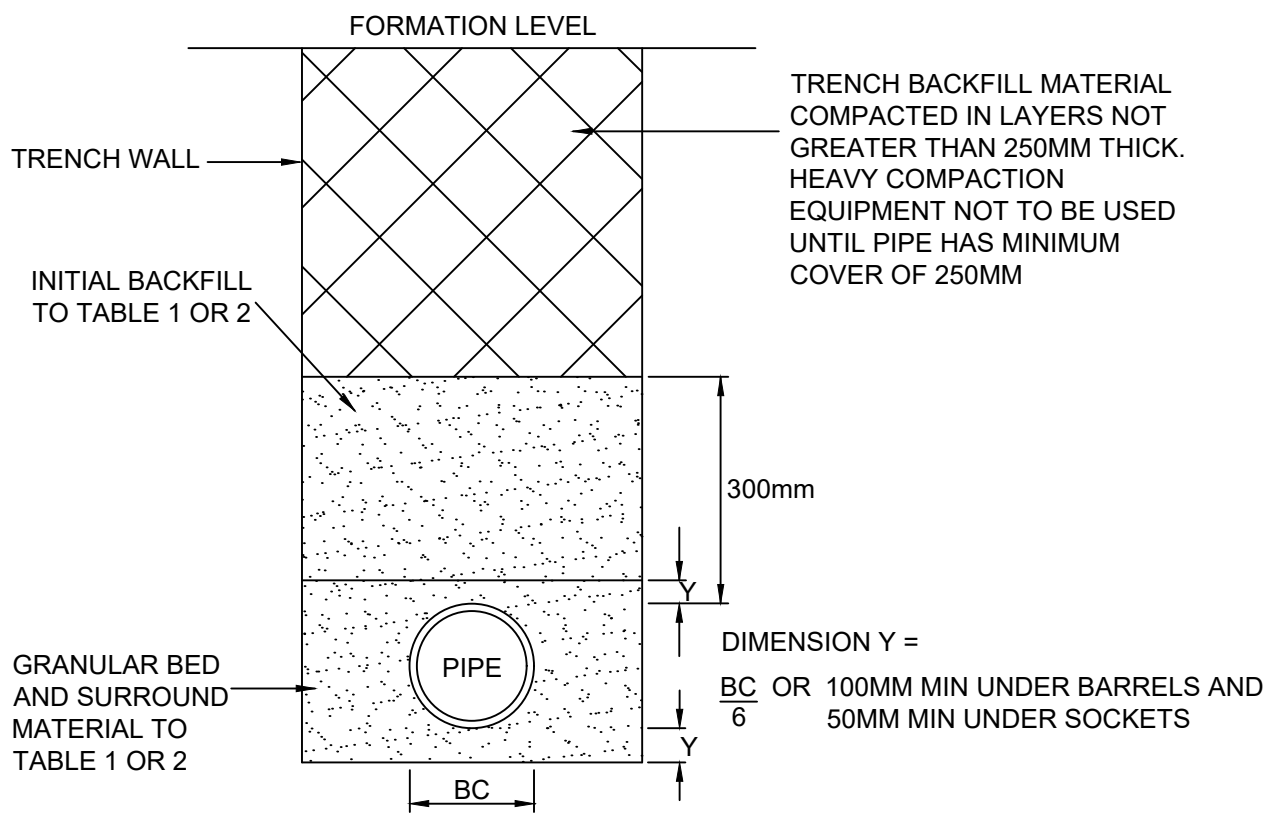




CLASS Z BED

Bedding and Sidefill Material

Bedding, sidefill and surround materials shall comply with Water Industry Specification No. 4-08-022. Bedding and sidefill material may be selected as dug granular material or processed granular material complying with Tables 1 and 2 for rigid and flexible pipes respectively. Material excavated from trenches dug through land contaminated with domestic, building or industrial waste should not be used as bedding and sidefill material. Selected excavated material should be readily compactable and be free from organic matter and combustible materials. Frozen soil should not be used. Do not use material with clumps or stones larger than 75mm and stones larger than those permitted in Tables 1 or 2 as appropriate should be discarded. All selected as-dug granular bedding and sidefill material should be evaluated using the Compaction Fraction Test detailed in Appendix B of the WIs No. 4-08-002. Materials are suitable if the values obtained do not exceed those given in Table 1 and 2 as appropriate.



CLASS S BED

Trench Backfill Material

Trench backfill material, whether selected from locally excavated material or imported, shall consist of uniform, readily compactable material, free from vegetable matter, building rubbish and frozen material, or materials susceptible to spontaneous combustion, and excluding clay of liquid limit greater than 80 and/or plastic limit greater than 55 and materials of excessively high moisture content. Clay lumps and stones retained on 75mm and 37.5mm sieves respectively shall be excluded from the backfill material. Trench backfill material to excavations situated in highways shall be Type 1 granular sub-base material to SHW Clause 803 up to formation level.

TABLE 1: PROCESSED GRANULAR BEDDING AND SIDEFILL MATERIALS FOR RIGID PIPES

Pipe nominal size (DN)	Nominal maximum particle size (mm) See note (c)	Class of bedding See note (d)	Maximum CF value for acceptability See note (b)	Materials specified in British Standards See note (a)
100	10	S B F N	0.15 0.30 0.15 0.30	10mm nominal single-size Coarse, medium or fine sand
Over 100 to 150	15	S B F N	0.15 0.30 0.15 0.30	10mm nominal single-size or 14mm to 5mm graded Coarse, medium or fine sand
Over 150 to 300	20	S B F N	0.15 0.30 0.15 0.30	10, 14 or 20mm nominal single-size or 14mm to 5mm graded or 20 to 5mm graded All-in aggregate or coarse, medium or fine sand
Over 300 to 550	20	S B F N	0.15 0.30 0.15 0.30	14 or 20mm nominal single-size or 14mm to 5mm graded or 20 to 5mm graded All-in aggregate or coarse, medium or fine sand
Over 550	40	S B F N	0.15 0.30 0.15 0.30	14, 20, or 40mm nominal single-size crushed rock or 14mm to 5mm graded or 20mm to 5mm graded or 40mm to 5mm graded All-in aggregate or coarse, medium or fine sand

Notes:

- (a) Processed granular materials to include aggregates to BS 882, air-cooled blastfurnace slag to BS 1047 and lightweight aggregates to BS 3797.
 - (b) Compaction Fraction value (CF), see Appendix B of WIS Ign No. 4-08-02.
 - (c) The nominal maximum particle sizes apply both to processed and as-dug materials (see Section 4 of Ign No. 4-08-01).
- Bedding classes are defined in:
- (d) BS 8005 : Part 1 Ign No. 4-11-02 TRRL - Simplified Table of Estimated Loads on Buried Pipes.
 - (e) The sulphate content of bedding and sidefill materials for use with cementitious pipe should not be greater than 0.3% as sulphur trioxide.

Bedding classes are defined in:-

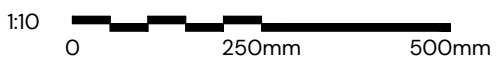
(e) The sulphate content of bedding and sidefill materials for use with cementitious pipe should not be greater than 0.3% as sulphur trioxide.

TABLE 2: PROCESSED GRANULAR BEDDING AND SIDEFILL MATERIALS FOR FLEXIBLE PIPES

Pipe nominal bore (mm) (See note (d))	Nominal maximum particle size (mm)	Maximum CF value for acceptability See note (b)		Materials specified in British Standards See note (a)
		Non-pressure pipe	Pressure pipe	
100	10	0.15	0.30	10mm nominal single-size
Over 100 to 150	15	0.15	0.30	10 or 14mm nominal single-size or 14mm to 5mm graded
Over 150 to 300	20	0.15	0.30	10, 14 or 20mm nominal single-size or 14mm to 5mm graded or 20mm to 5mm graded
Over 300 to 550	20	0.15	0.30	14 or 20mm nominal single-size or 14mm to 5mm graded or 20mm to 5mm graded
Over 550	40	0.15	0.30	14, 20 or 40mm single-size or 14mm to 5mm graded or 20mm to 5mm graded or 40mm to 5mm graded

Notes:

- (a) Processed granular materials to include aggregates to BS 882, air-cooled blastfurnace slag to BS 1047 and lightweight aggregates to BS 3797.
- (b) Compaction Fraction value (CF), see Appendix B of WIs IG N. No. 4-08-02.
- (c) For the purpose of this table, PE pipes of 630mm OD can be regarded as having nominal bore of over 550mm, irrespective of wall thickness.
- (d) Nominal bore is used in preference to DN because of the different nominal size classification for flexible pipes.
- (e) For PE80 and PE100 polyethylene pipe complying with current relevant Water Industry Specifications, the maximum sidefill particle size may be increased to 10% of the pipe nominal size.
- (f) For modulus of soil reaction E_s values for processed granular materials reference should be made to Table A.3 of WIs IG N. No. 4-08-02 where specific site tests have not been performed.
- (g) For ferrous cementitious pipeline materials, the sulphate content of bedding and sidefill materials should not be greater than 0.3% as sulphur trioxide.

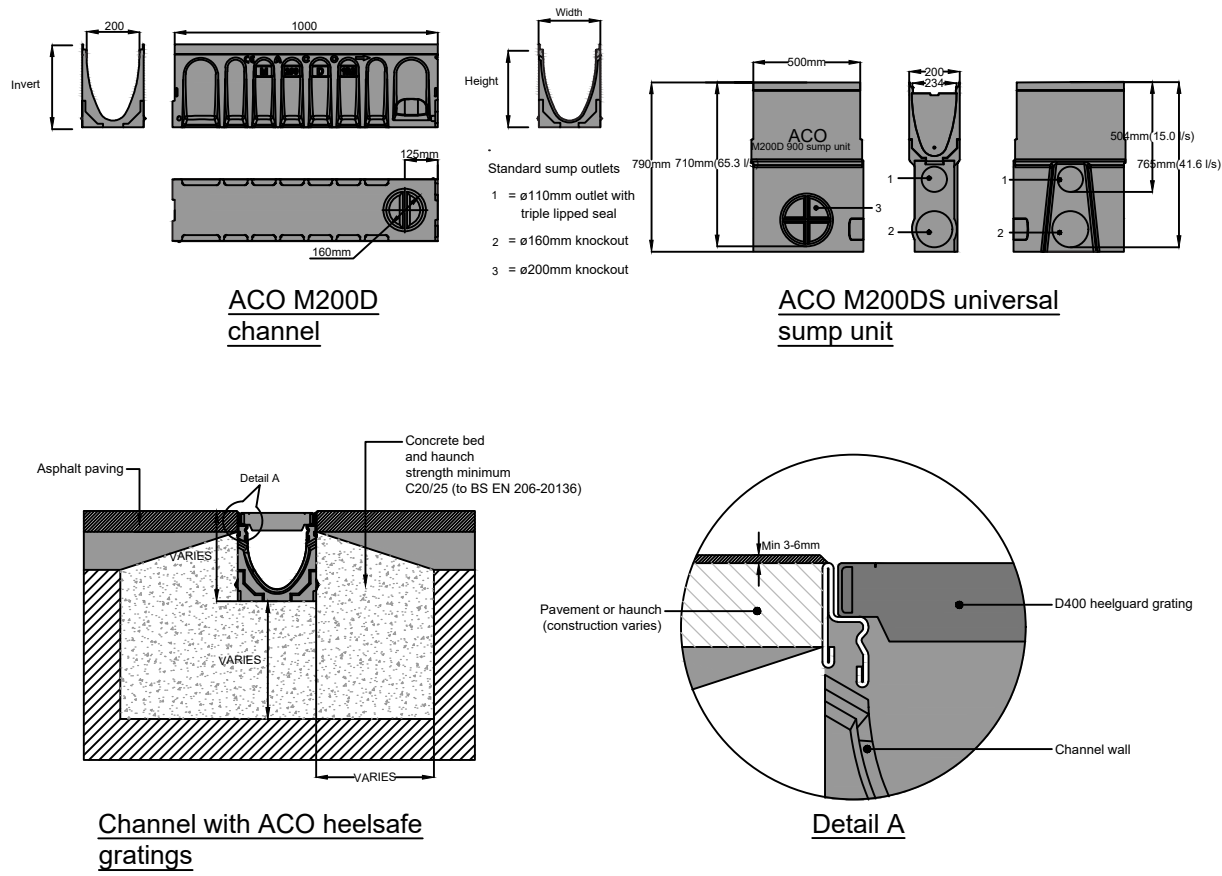


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4. All measurements are in millimetres unless stated otherwise.
5. Oil interceptor details can be obtained directly from chosen manufacturer.

Reference Drawings:

P23-2674-PEG-XX-XX-DR-C-0200 Drainage Strategy
P23-2674-PEG-XX-XX-DR-C-0201 Impermeable Area Plan
P23-2674-PEG-XX-XX-DR-C-0205 Existing Drainage Strategy
P23-2674-PEG-XX-XX-DR-C-0206 Existing Catchment Plan
P23-2674-PEG-XX-XX-DR-C-0220 Standard Details Sheet 1
P23-2674-PEG-XX-XX-DR-C-0221 Standard Details Sheet 2



Aco Drain - Typical Detail

nts

P1	16.12.2024	First Issue	AT	SD	SD
REV	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED

Village Hotels – Bury
Standard Details – Sheet 1

Waterfold Business Park, Rochdale Rd
Bury, BL9 7BQ

CLIENT:
Village Hotels

DATE: 16.12.2024 SCALE: AS SHOWN @ A1

DRAWING NUMBER: P23-2674- PEG-XX-XX-DR-C-0220-P1 PG OFFICE / TEAM BIR / INF

PEGASUS REF No:	DRAWING STATUS
P23-2674	S2



Appendix E – Existing and Proposed Calculations

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	5.00
Return Period (years)	2	Maximum Rainfall (mm/hr)	75.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.400	Preferred Cover Depth (m)	1.200
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
Ex SW10	0.024	5.00	75.360	1200	381776.340	410452.491	1.780
Ex SW11	0.098	5.00	75.320	1200	381848.441	410436.982	2.085
Ex SW14	0.052	5.00	75.310	1200	381897.143	410424.281	1.700
Ex SW13			75.310	1200	381862.455	410488.428	2.202

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
Ex 1.000	Ex SW10	Ex SW11	73.750	0.600	73.580	73.310	0.270	273.1	225	5.00	70.3
Ex 2.000	Ex SW14	Ex SW11	50.331	0.600	73.610	73.310	0.300	167.8	225	5.00	70.3
Ex 1.001	Ex SW11	Ex SW13	53.321	0.600	73.235	73.108	0.127	419.9	300	5.00	70.3

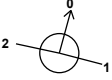
Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
Ex 1.000	0.786	31.3	4.6	1.555	1.785	0.024	0.0	58	0.561
Ex 2.000	1.006	40.0	9.9	1.475	1.785	0.052	0.0	76	0.837
Ex 1.001	0.761	53.8	33.2	1.785	1.902	0.174	0.0	171	0.800

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
Ex 1.000	73.750	273.1	225	Circular	75.360	73.580	1.555	75.320	73.310	1.785
Ex 2.000	50.331	167.8	225	Circular	75.310	73.610	1.475	75.320	73.310	1.785
Ex 1.001	53.321	419.9	300	Circular	75.320	73.235	1.785	75.310	73.108	1.902

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
Ex 1.000	Ex SW10	1200	Manhole	Adoptable	Ex SW11	1200	Manhole	Adoptable
Ex 2.000	Ex SW14	1200	Manhole	Adoptable	Ex SW11	1200	Manhole	Adoptable
Ex 1.001	Ex SW11	1200	Manhole	Adoptable	Ex SW13	1200	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
Ex SW10	381776.340	410452.491	75.360	1.780	1200				
						0	Ex 1.000	73.580	225
Ex SW11	381848.441	410436.982	75.320	2.085	1200				
						1	Ex 2.000	73.310	225
						2	Ex 1.000	73.310	225
						0	Ex 1.001	73.235	300
Ex SW14	381897.143	410424.281	75.310	1.700	1200				
						0	Ex 2.000	73.610	225
Ex SW13	381862.455	410488.428	75.310	2.202	1200				
						1	Ex 1.001	73.108	300

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
Rainfall Events	Singular	Skip Steady State	x
FSR Region	England and Wales	Drain Down Time (mins)	240
M5-60 (mm)	20.000	Additional Storage (m³/ha)	20.0
Ratio-R	0.400	Starting Level (m)	
Summer CV	0.750	Check Discharge Rate(s)	x
Winter CV	0.840	Check Discharge Volume	x

Storm Durations

15 | 30 | 60 | 120 | 180 | 240 | 360 | 480 | 600 | 720 | 960 | 1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
2	0	0	0
30	0	0	0
100	0	0	0
100	40	0	0

Results for 2 year Critical Storm Duration. Lowest mass balance: 99.61%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	Ex SW10	11	73.635	0.055	4.4	0.0766	0.0000	OK
15 minute winter	Ex SW11	11	73.398	0.163	31.0	0.3376	0.0000	OK
15 minute winter	Ex SW14	10	73.684	0.074	9.5	0.1286	0.0000	OK
15 minute winter	Ex SW13	11	73.239	0.131	29.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	Ex SW10	Ex 1.000	Ex SW11	4.1	0.461	0.132	0.8043	
15 minute winter	Ex SW11	Ex 1.001	Ex SW13	29.0	0.855	0.540	1.8264	14.6
15 minute winter	Ex SW14	Ex 2.000	Ex SW11	9.2	0.766	0.231	0.6401	

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.61%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	Ex SW10	11	73.656	0.076	8.3	0.1071	0.0000	OK
15 minute winter	Ex SW11	11	73.488	0.253	59.0	0.5234	0.0000	OK
15 minute winter	Ex SW14	10	73.713	0.103	18.0	0.1801	0.0000	OK
15 minute winter	Ex SW13	11	73.290	0.182	54.7	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	Ex SW10	Ex 1.000	Ex SW11	7.9	0.448	0.253	1.6786	
15 minute winter	Ex SW11	Ex 1.001	Ex SW13	54.7	1.007	1.018	2.8784	27.8
15 minute winter	Ex SW14	Ex 2.000	Ex SW11	17.5	0.802	0.438	1.2879	

Results for 100 year Critical Storm Duration. Lowest mass balance: 99.61%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	Ex SW10	11	73.668	0.088	10.8	0.1233	0.0000	OK
15 minute winter	Ex SW11	11	73.575	0.340	76.8	0.7050	0.0000	SURCHARGED
15 minute winter	Ex SW14	10	73.730	0.120	23.3	0.2100	0.0000	OK
15 minute winter	Ex SW13	11	73.317	0.209	71.9	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	Ex SW10	Ex 1.000	Ex SW11	10.3	0.434	0.330	1.9964	
15 minute winter	Ex SW11	Ex 1.001	Ex SW13	71.9	1.078	1.337	3.2763	36.0
15 minute winter	Ex SW14	Ex 2.000	Ex SW11	22.8	0.812	0.569	1.5450	

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.61%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	Ex SW10	12	73.807	0.227	15.1	0.3183	0.0000	SURCHARGED
15 minute winter	Ex SW11	11	73.744	0.509	99.0	1.0537	0.0000	SURCHARGED
15 minute winter	Ex SW14	11	73.943	0.333	32.7	0.5811	0.0000	SURCHARGED
15 minute winter	Ex SW13	11	73.345	0.237	92.5	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	Ex SW10	Ex 1.000	Ex SW11	16.7	0.439	0.535	2.9323	
15 minute winter	Ex SW11	Ex 1.001	Ex SW13	92.5	1.343	1.720	3.4678	50.2
15 minute winter	Ex SW14	Ex 2.000	Ex SW11	30.7	0.829	0.766	2.0017	

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	5.00
Return Period (years)	2	Maximum Rainfall (mm/hr)	75.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.400	Preferred Cover Depth (m)	1.200
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	✓

Nodes

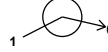
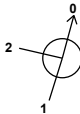
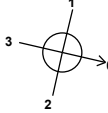
Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
Ex SW10	0.024	5.00	75.360	1200	381776.340	410452.491	1.780
Ex SW11	0.050	5.00	75.280	1200	381848.441	410436.982	1.970
Ex SW14	0.052	5.00	75.310	1200	381897.143	410424.281	1.700
Ex SW13			75.310	1200	381862.455	410488.428	2.329
PRS2			75.280	1200	381780.644	410454.696	1.730
PRS6			75.280	1200	381849.047	410438.926	2.127
PRS4			75.180	1200	381839.668	410441.088	1.830
PP1	0.037	5.00	75.200	600	381840.320	410443.795	0.700
PP2	0.037	5.00	75.200	600	381838.897	410437.621	0.700

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	4.836	161.2	225	Circular	75.360	73.580	1.555	75.280	73.550	1.505
1.001	60.572	302.9	225	Circular	75.280	73.550	1.505	75.180	73.350	1.605
Ex 2.000	50.331	167.8	225	Circular	75.310	73.610	1.475	75.280	73.310	1.745
2.000	2.036	24.8	225	Circular	75.280	73.310	1.745	75.280	73.228	1.827
Ex 1.001	51.286	298.2	300	Circular	75.280	73.153	1.827	75.310	72.981	2.029
1.002	9.625	137.5	225	Circular	75.180	73.350	1.605	75.280	73.280	1.775
3.000	2.784	59.2	100	Circular	75.200	74.500	0.600	75.180	74.453	0.627
4.000	3.552	59.2	100	Circular	75.200	74.500	0.600	75.180	74.440	0.640

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	Ex SW10	1200	Manhole	Adoptable	PRS2	1200	Manhole	Adoptable
1.001	PRS2	1200	Manhole	Adoptable	PRS4	1200	Manhole	Adoptable
Ex 2.000	Ex SW14	1200	Manhole	Adoptable	Ex SW11	1200	Manhole	Adoptable
2.000	Ex SW11	1200	Manhole	Adoptable	PRS6	1200	Manhole	Adoptable
Ex 1.001	PRS6	1200	Manhole	Adoptable	Ex SW13	1200	Manhole	Adoptable
1.002	PRS4	1200	Manhole	Adoptable	PRS6	1200	Manhole	Adoptable
3.000	PP1	600	Manhole	Adoptable	PRS4	1200	Manhole	Adoptable
4.000	PP2	600	Manhole	Adoptable	PRS4	1200	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
Ex SW10	381776.340	410452.491	75.360	1.780	1200				
						0	1.000	73.580	225
Ex SW11	381848.441	410436.982	75.280	1.970	1200		1	Ex 2.000	73.310
						0	2.000	73.310	225
Ex SW14	381897.143	410424.281	75.310	1.700	1200				
						0	Ex 2.000	73.610	225
Ex SW13	381862.455	410488.428	75.310	2.329	1200		1	Ex 1.001	72.981
									300
PRS2	381780.644	410454.696	75.280	1.730	1200		1	1.000	73.550
						0	1.001	73.550	225
PRS6	381849.047	410438.926	75.280	2.127	1200		1	2.000	73.228
						2	1.002	73.280	225
						0	Ex 1.001	73.153	300
PRS4	381839.668	410441.088	75.180	1.830	1200		1	3.000	74.453
						2	4.000	74.440	100
						3	1.001	73.350	225
						0	1.002	73.350	225
PP1	381840.320	410443.795	75.200	0.700	600				
						0	3.000	74.500	100
PP2	381838.897	410437.621	75.200	0.700	600				
						0	4.000	74.500	100

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
Rainfall Events	Singular	Skip Steady State	x
FSR Region	England and Wales	Drain Down Time (mins)	240
M5-60 (mm)	20.000	Additional Storage (m³/ha)	20.0
Ratio-R	0.400	Starting Level (m)	
Summer CV	0.750	Check Discharge Rate(s)	x
Winter CV	0.840	Check Discharge Volume	x

Storm Durations

15 | 30 | 60 | 120 | 180 | 240 | 360 | 480 | 600 | 720 | 960 | 1440

Results for 2 year Critical Storm Duration. Lowest mass balance: 99.82%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	Ex SW10	10	73.634	0.054	4.4	0.0763	0.0000	OK
15 minute winter	Ex SW11	11	73.390	0.080	18.3	0.1314	0.0000	OK
15 minute winter	Ex SW14	10	73.683	0.073	9.5	0.1281	0.0000	OK
15 minute winter	Ex SW13	11	73.094	0.113	22.1	0.0000	0.0000	OK
15 minute winter	PRS2	11	73.609	0.059	4.3	0.0665	0.0000	OK
15 minute winter	PRS6	11	73.278	0.125	22.3	0.1413	0.0000	OK
15 minute winter	PRS4	12	73.401	0.051	4.7	0.0578	0.0000	OK
120 minute winter	PP1	98	74.622	0.122	2.1	4.3794	0.0000	SURCHARGED
120 minute winter	PP2	98	74.622	0.122	2.1	4.3794	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	Ex SW10	1.000	PRS2	4.3	0.570	0.106	0.0372	
15 minute winter	Ex SW11	2.000	PRS6	18.0	1.663	0.172	0.0221	
15 minute winter	Ex SW14	Ex 2.000	Ex SW11	9.2	0.773	0.230	0.5994	
15 minute winter	PRS2	1.001	PRS4	4.2	0.576	0.142	0.4450	
15 minute winter	PRS6	Ex 1.001	Ex SW13	22.1	0.854	0.346	1.3357	16.2
15 minute winter	PRS4	1.002	PRS6	4.6	0.706	0.104	0.0629	
120 minute winter	PP1	Orifice	PRS4	0.4				
120 minute winter	PP2	Orifice	PRS4	0.4				

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.82%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	Ex SW10	10	73.658	0.078	8.3	0.1097	0.0000	OK
15 minute winter	Ex SW11	11	73.432	0.122	34.9	0.1992	0.0000	OK
15 minute winter	Ex SW14	10	73.715	0.105	18.0	0.1821	0.0000	OK
15 minute winter	Ex SW13	11	73.140	0.159	42.5	0.0000	0.0000	OK
15 minute winter	PRS2	11	73.632	0.082	8.2	0.0927	0.0000	OK
15 minute winter	PRS6	11	73.338	0.185	42.4	0.2091	0.0000	OK
15 minute winter	PRS4	12	73.421	0.071	8.8	0.0804	0.0000	OK
120 minute winter	PP1	116	74.741	0.241	4.0	8.8304	0.0000	SURCHARGED
120 minute winter	PP2	116	74.741	0.241	4.0	8.8304	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	Ex SW10	1.000	PRS2	8.2	0.661	0.201	0.0606	
15 minute winter	Ex SW11	2.000	PRS6	34.1	1.831	0.325	0.0419	
15 minute winter	Ex SW14	Ex 2.000	Ex SW11	17.6	0.886	0.440	0.9994	
15 minute winter	PRS2	1.001	PRS4	8.1	0.685	0.271	0.7160	
15 minute winter	PRS6	Ex 1.001	Ex SW13	42.5	1.017	0.664	2.1422	29.9
15 minute winter	PRS4	1.002	PRS6	8.6	0.837	0.195	0.0991	
120 minute winter	PP1	Orifice	PRS4	0.6				
120 minute winter	PP2	Orifice	PRS4	0.6				

Results for 100 year Critical Storm Duration. Lowest mass balance: 99.82%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	Ex SW10	10	73.672	0.092	10.8	0.1284	0.0000	OK
15 minute winter	Ex SW11	11	73.460	0.150	45.4	0.2464	0.0000	OK
15 minute winter	Ex SW14	10	73.731	0.121	23.3	0.2110	0.0000	OK
15 minute winter	Ex SW13	11	73.163	0.182	54.7	0.0000	0.0000	OK
15 minute winter	PRS2	11	73.644	0.094	10.7	0.1068	0.0000	OK
15 minute winter	PRS6	11	73.375	0.222	54.8	0.2509	0.0000	OK
15 minute winter	PRS4	12	73.433	0.083	11.4	0.0943	0.0000	OK
180 minute winter	PP1	148	74.826	0.326	3.9	11.9752	0.0000	SURCHARGED
180 minute winter	PP2	148	74.826	0.326	3.9	11.9752	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	Ex SW10	1.000	PRS2	10.7	0.701	0.261	0.0743	
15 minute winter	Ex SW11	2.000	PRS6	44.0	1.860	0.420	0.0566	
15 minute winter	Ex SW14	Ex 2.000	Ex SW11	23.0	0.927	0.574	1.2466	
15 minute winter	PRS2	1.001	PRS4	10.5	0.725	0.354	0.8819	
15 minute winter	PRS6	Ex 1.001	Ex SW13	54.7	1.087	0.855	2.5768	38.1
15 minute winter	PRS4	1.002	PRS6	11.2	0.880	0.253	0.1405	
180 minute winter	PP1	Orifice	PRS4	0.7				
180 minute winter	PP2	Orifice	PRS4	0.7				

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.82%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	Ex SW10	10	73.693	0.113	15.1	0.1585	0.0000	OK
15 minute winter	Ex SW11	11	73.543	0.233	63.3	0.3824	0.0000	SURCHARGED
15 minute winter	Ex SW14	10	73.760	0.150	32.7	0.2615	0.0000	OK
15 minute winter	Ex SW13	11	73.192	0.211	72.9	0.0000	0.0000	OK
15 minute winter	PRS2	11	73.664	0.114	14.9	0.1291	0.0000	OK
15 minute winter	PRS6	11	73.457	0.304	73.8	0.3436	0.0000	SURCHARGED
15 minute winter	PRS4	12	73.467	0.117	16.0	0.1327	0.0000	OK
180 minute winter	PP1	168	74.973	0.473	5.4	17.4856	0.0000	FLOOD RISK
180 minute winter	PP2	168	74.973	0.473	5.4	17.4856	0.0000	FLOOD RISK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	Ex SW10	1.000	PRS2	14.9	0.754	0.366	0.0970	
15 minute winter	Ex SW11	2.000	PRS6	60.7	1.860	0.579	0.0810	
15 minute winter	Ex SW14	Ex 2.000	Ex SW11	31.9	0.965	0.798	1.6980	
15 minute winter	PRS2	1.001	PRS4	15.0	0.788	0.505	1.2100	
15 minute winter	PRS6	Ex 1.001	Ex SW13	72.9	1.148	1.140	3.1623	51.8
15 minute winter	PRS4	1.002	PRS6	16.4	0.918	0.370	0.2611	
180 minute winter	PP1	Orifice	PRS4	0.9				
180 minute winter	PP2	Orifice	PRS4	0.9				

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